



Data Visualization

Do's & Don'ts

Janis Gulbis



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Part of my job is to sit
in the corner and look
at ~~paintings~~ reports.

~~Mr. Bean~~



Community Days
April 12, 2019

**Why
Analyze?**

**Why
Visualize?**

How?

An hourglass with blue sand is positioned on a beach of smooth, grey and white pebbles. The hourglass is made of dark wood and has a glass bulb in the center. The sand is a vibrant blue color. The background is a soft, out-of-focus landscape of a beach and ocean under a warm, golden light. A dark blue horizontal band is overlaid across the middle of the image, containing the text.

Where Did It All Start?

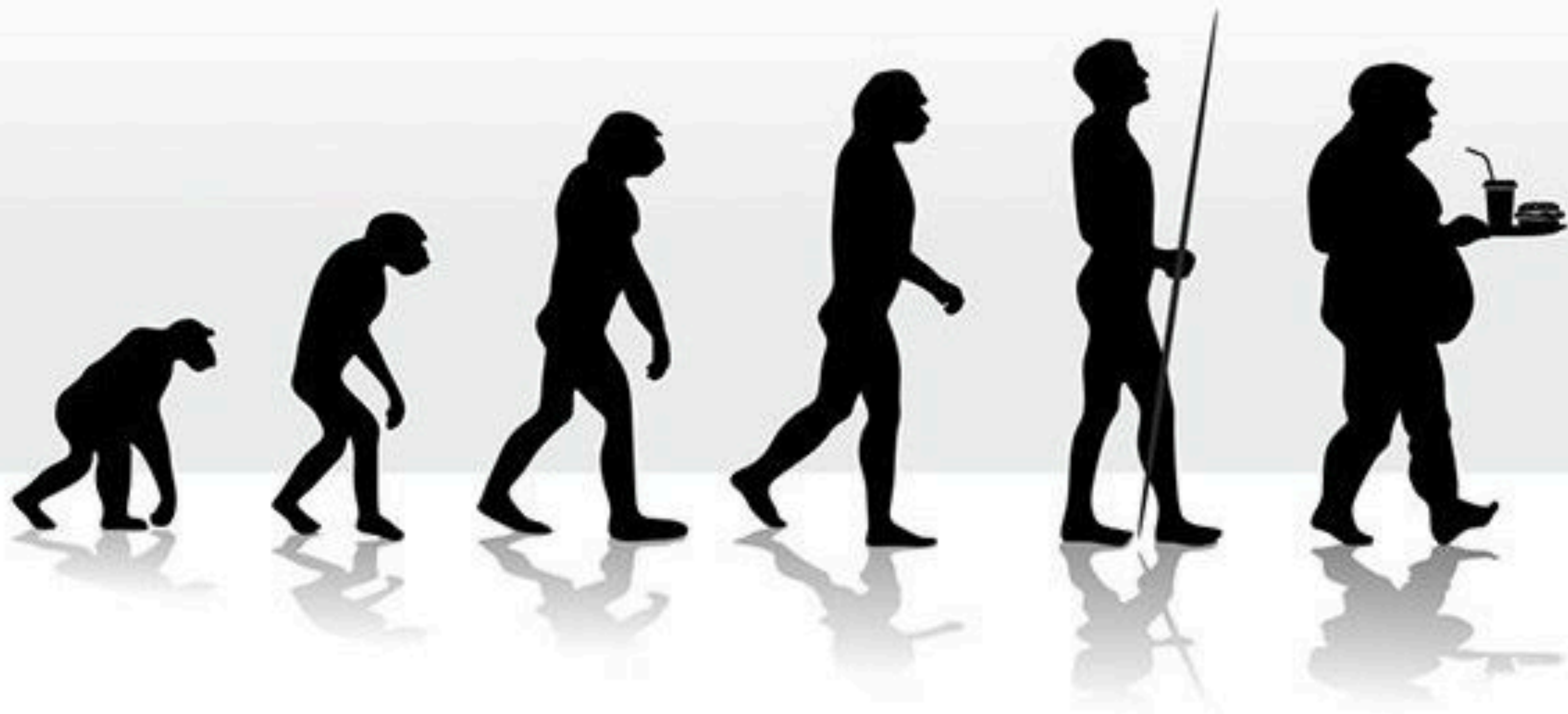
Baboons Can Count Too



RESULTS

**The baboons
chose the
container that had
more peanuts in
67% of the time.**





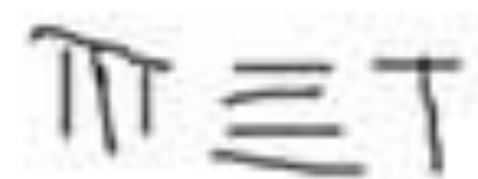
$$\text{stick figure} + \uparrow + \text{bear} = \text{penguin}$$

$$\text{stick figure} - \uparrow + \text{bear} = \text{sheep}$$





1 2 3 4 5 6 7 8 9



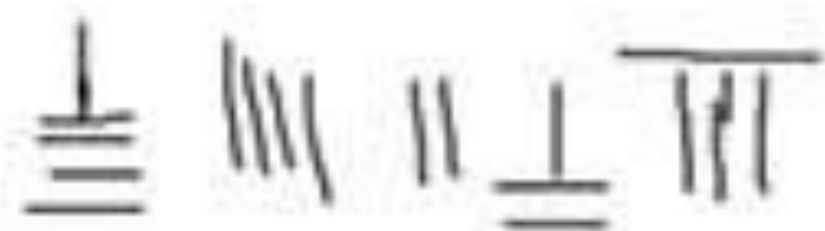
846



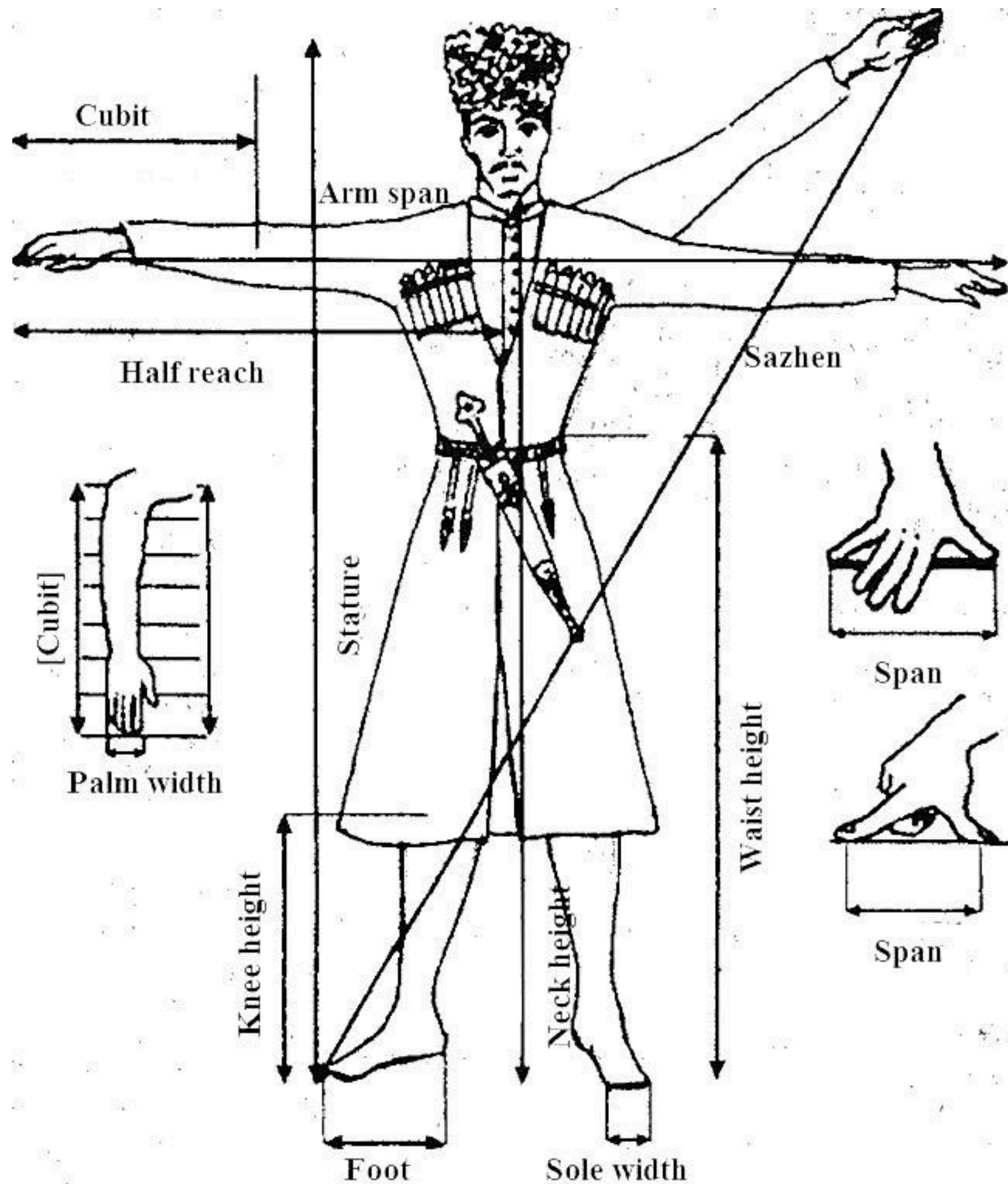
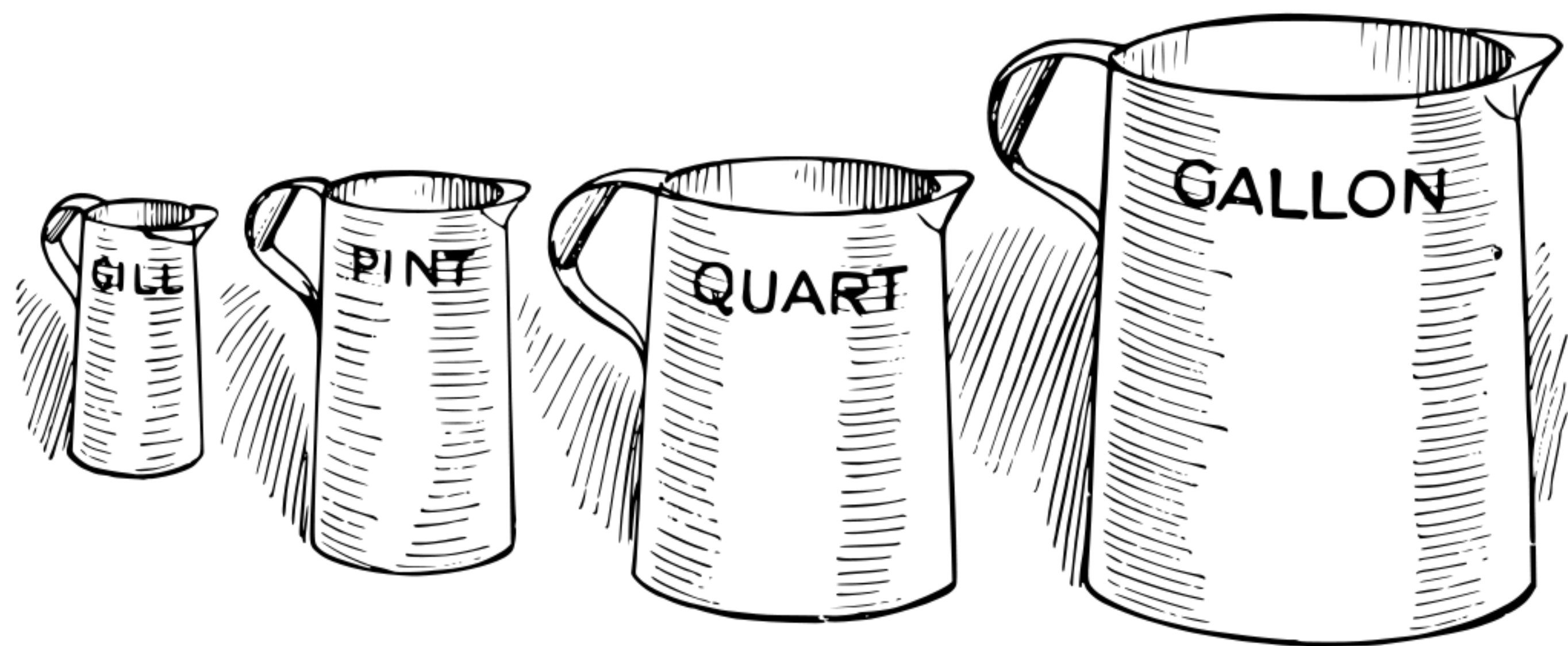
51,729



2,063



940,278



“

*You can't **improve** what you can't manage, you can't **manage** what you can't control, and you can't **control** what you don't **measure**.*

TOM DEMARKO

Transforming Data Into Knowledge



FACTS

90% of information transmitted to the brain is visual.



FACTS

Visualizations help us detect patterns, trends, and correlations.



FACTS

Visuals are more strongly tied to memory.

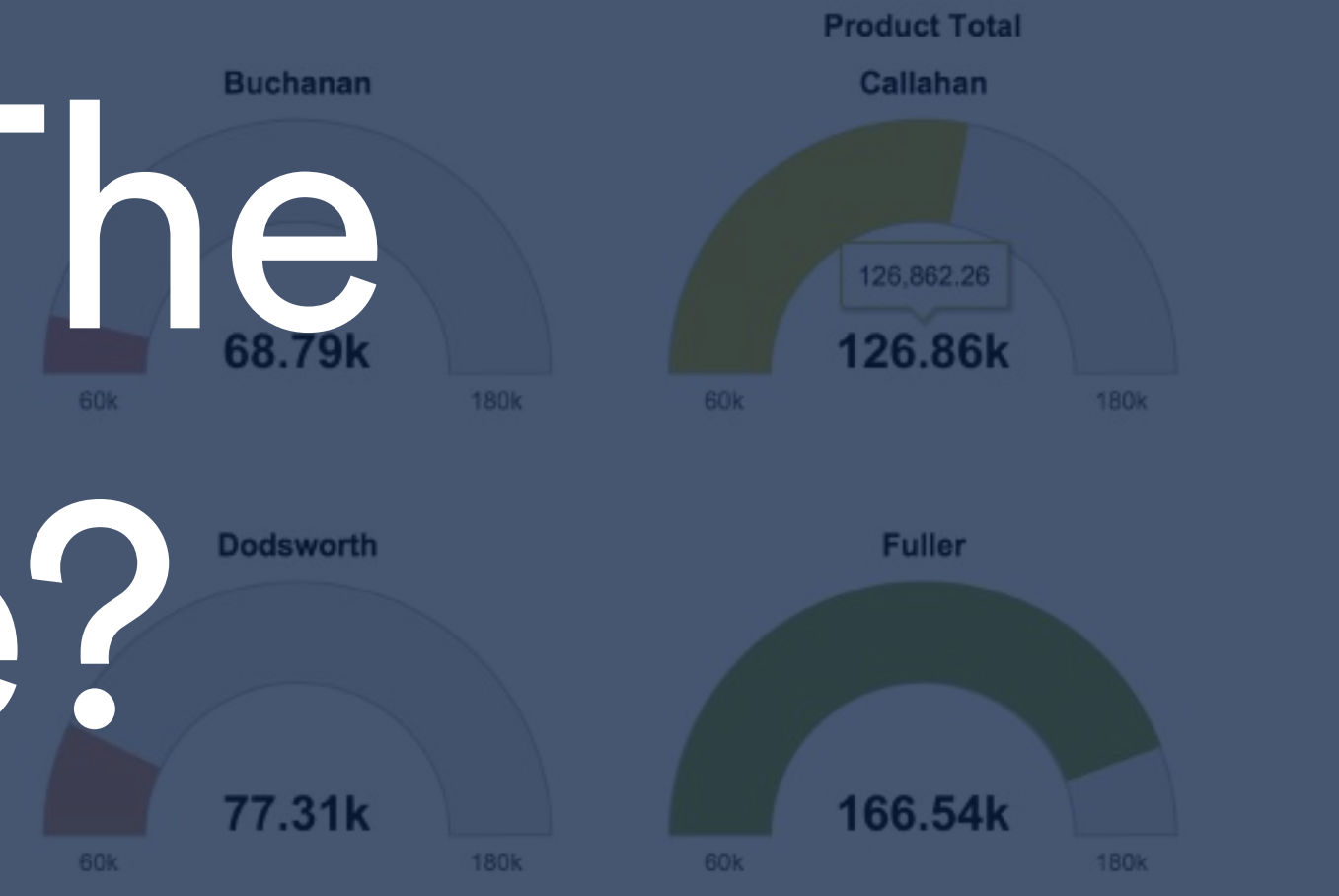
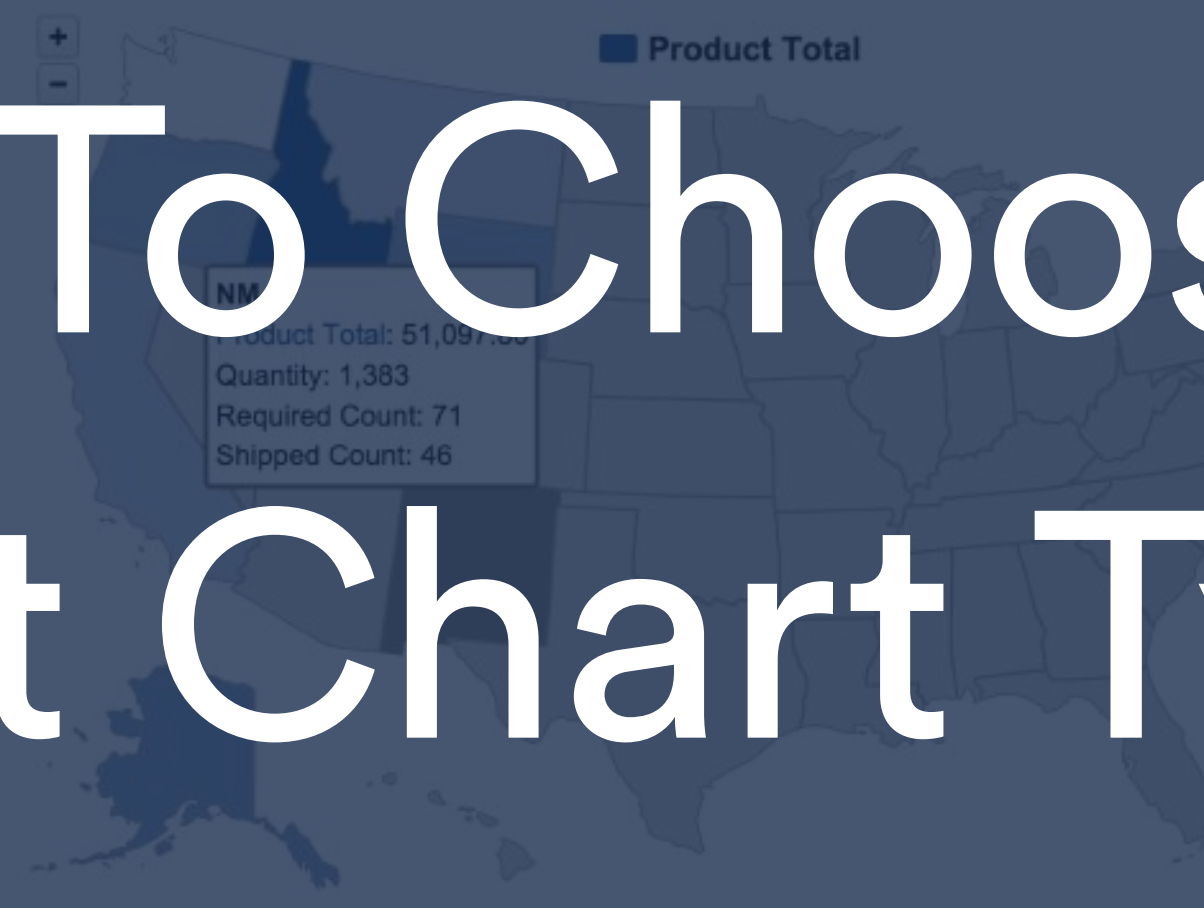
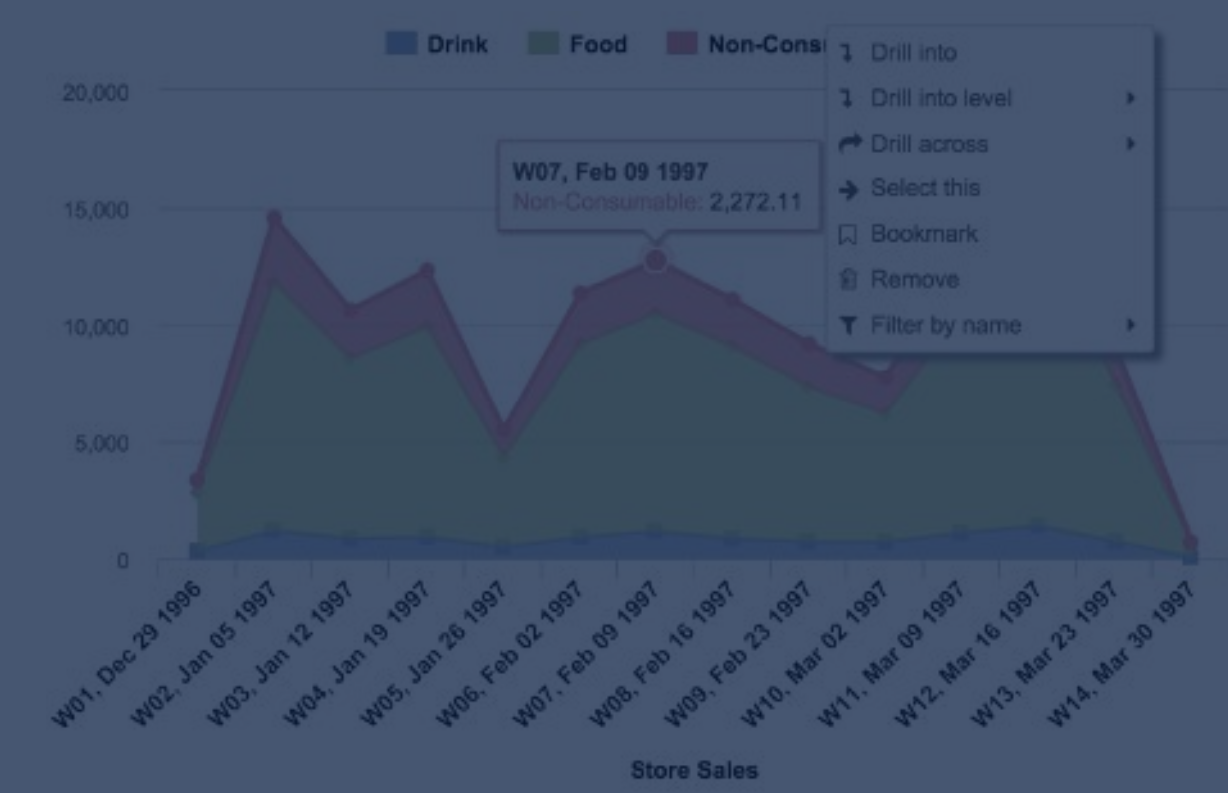


FACTS

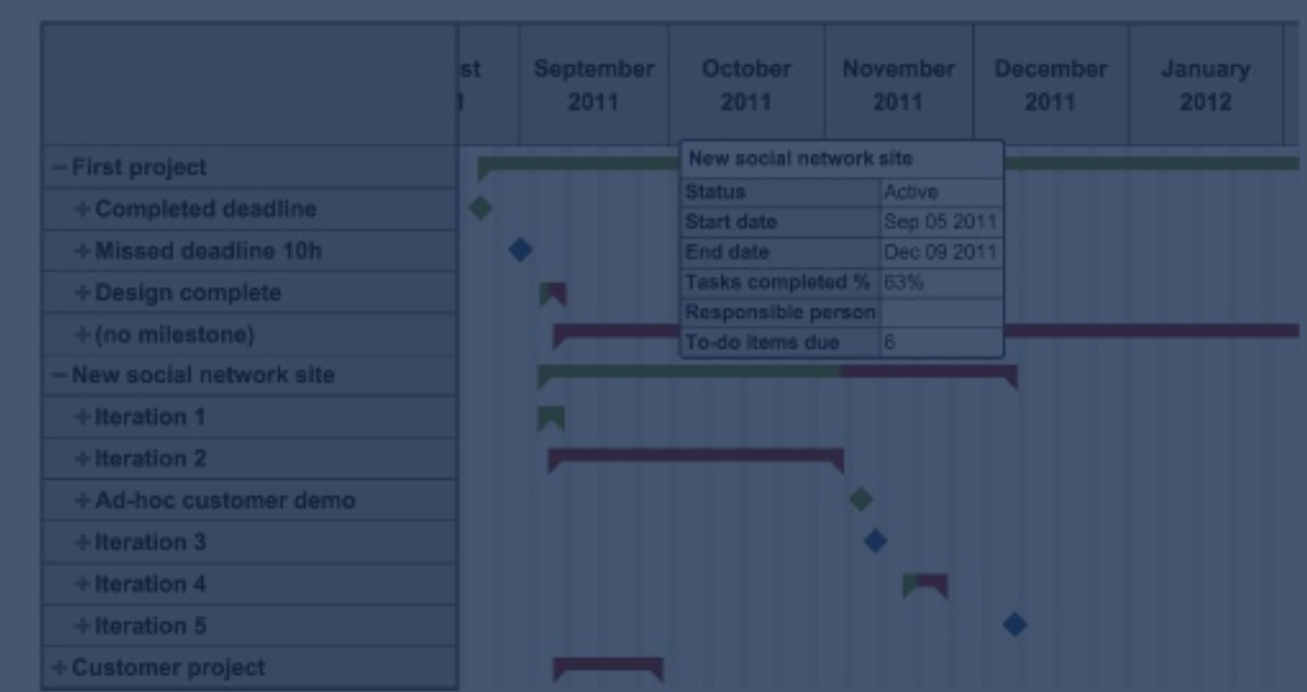
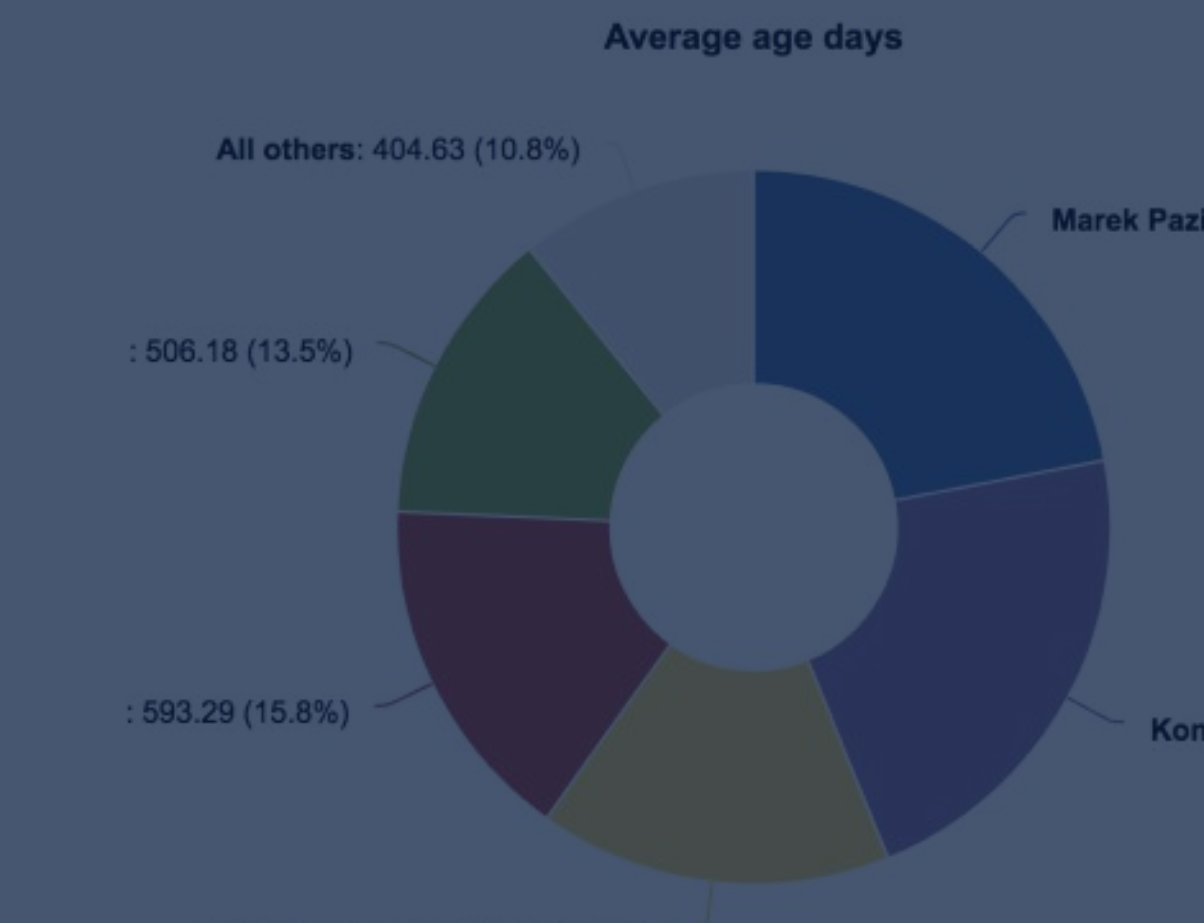
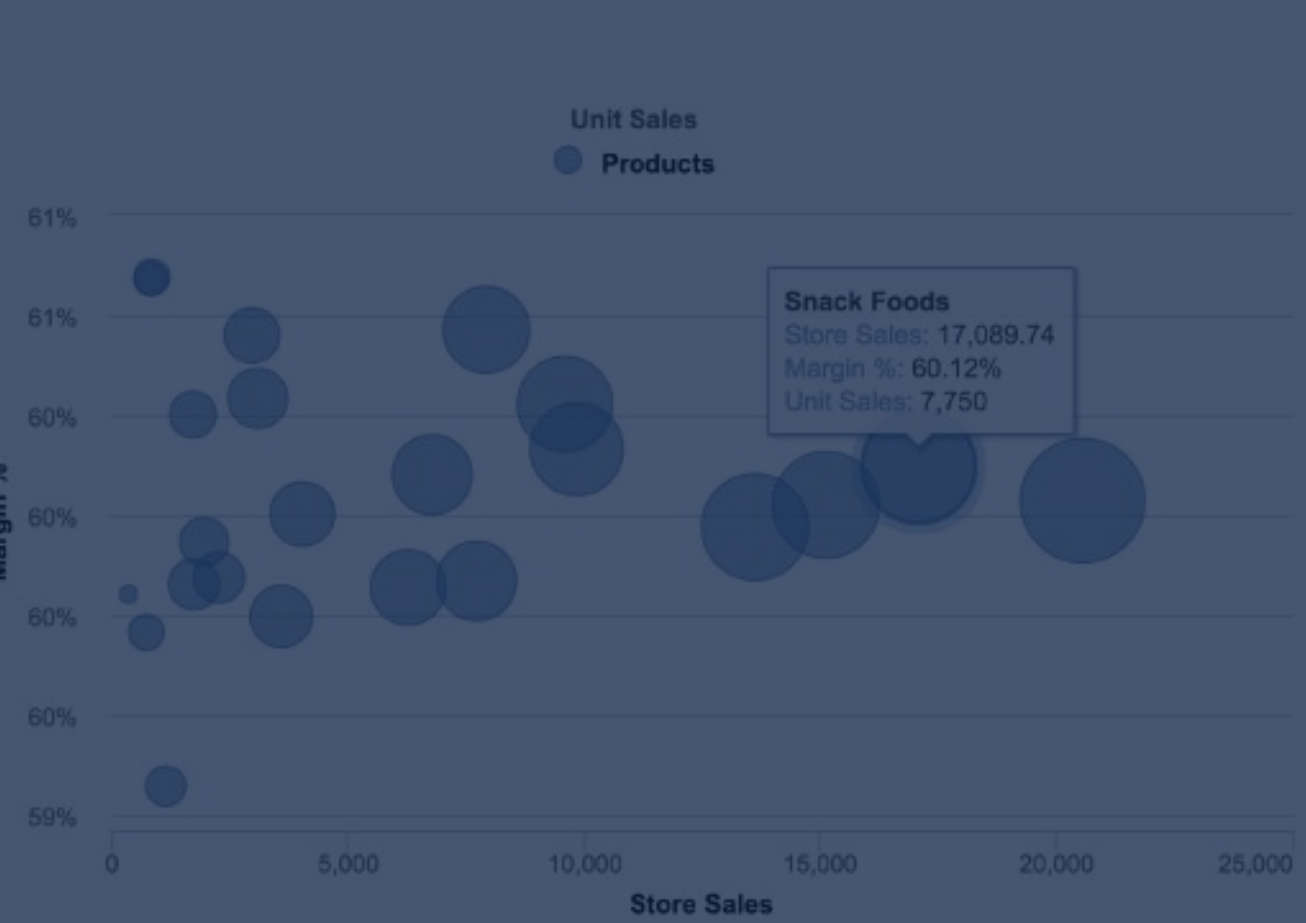
**Visual content drives
engagement.**

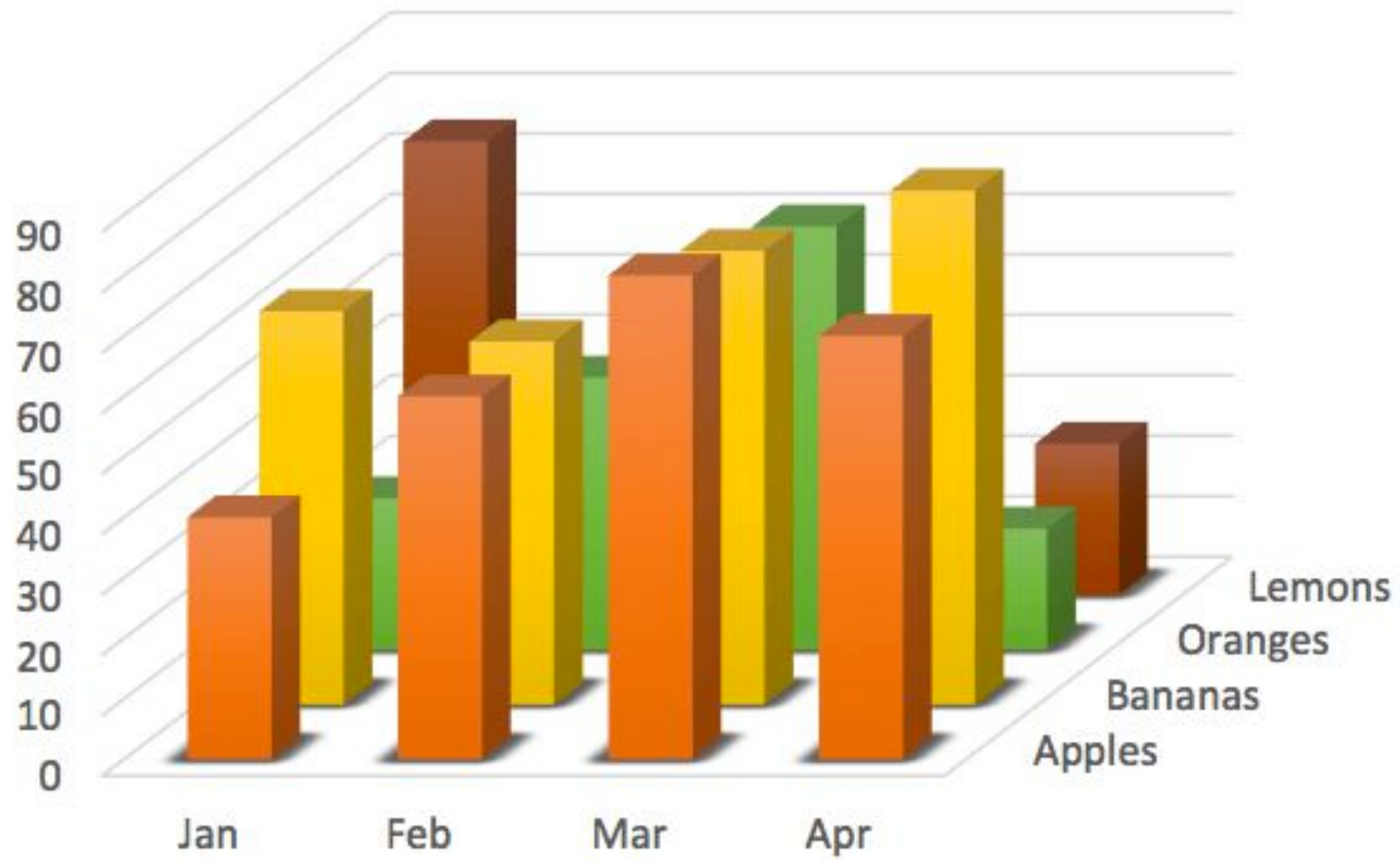


	Store Sales	Store Cost	Unit	Average
- All Customers	139,628.35	55,752.240		
- USA	139,628.35	55,752.240		
+ CA	36,175.20	14,431.085		
- OR	40,170.29	16,081.073		
+ Albany	4,491.26	1,782.817		
+ Beaverton	2,407.97	950.358		
+ Corvallis	5,695.13	2,281.248		
+ Lake Oswego	2,262.56	907.6483	1,102	6.41
+ Lebanon	5,934.62	2,390.0872	2,826	6.49
+ Milwaukie	2,892.32	1,155.6925	1,345	6.92
+ Oregon City	2,324.62	929.6752	1,113	6.55
+ Portland	2,122.12	847.5187	1,001	6.65
+ Salem	4,251.81	1,697.9039	2,104	6.28
+ W. Linn	2,161.61	871.0418	1,041	6.59

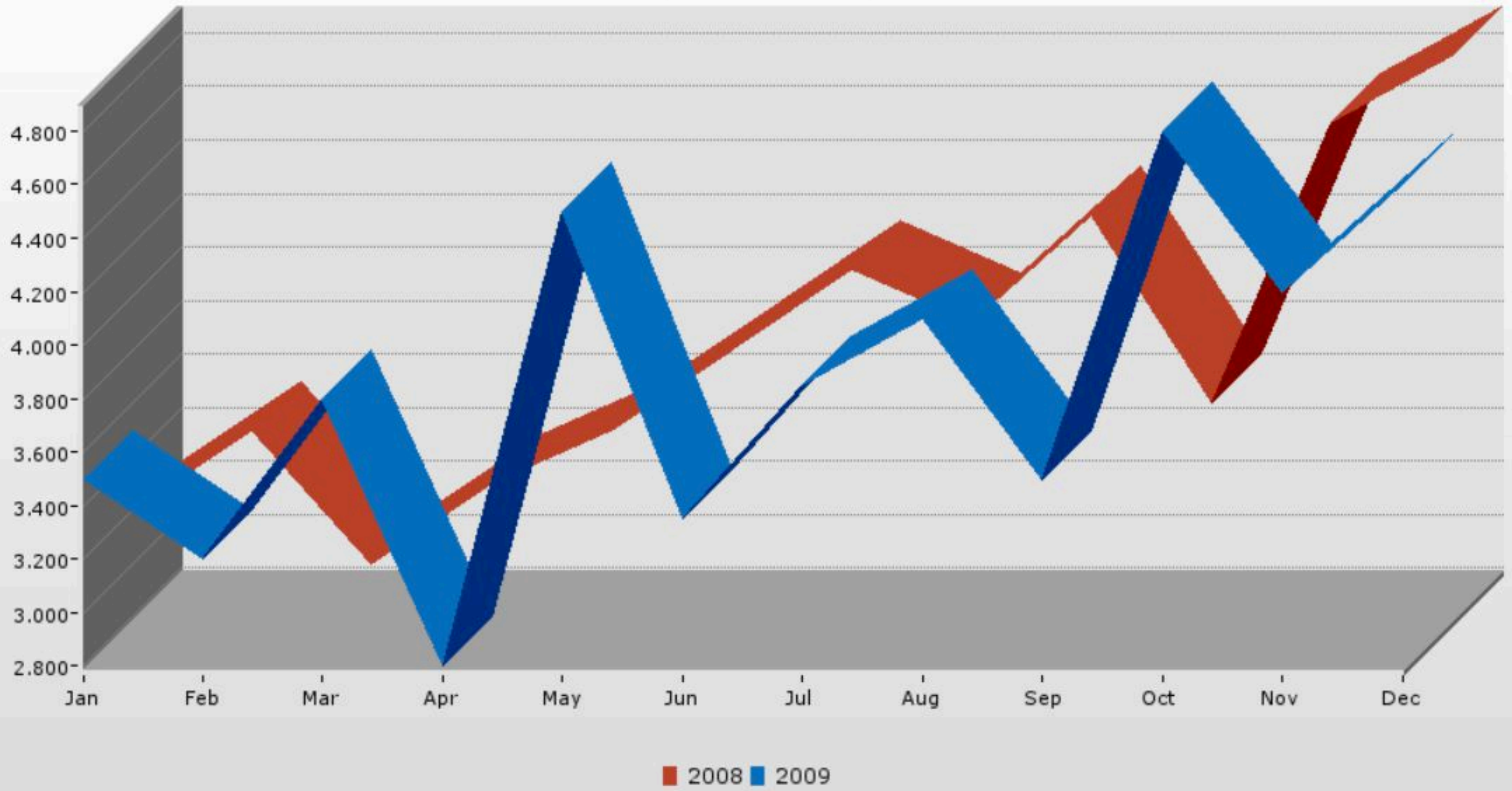


How To Choose The Best Chart Type?

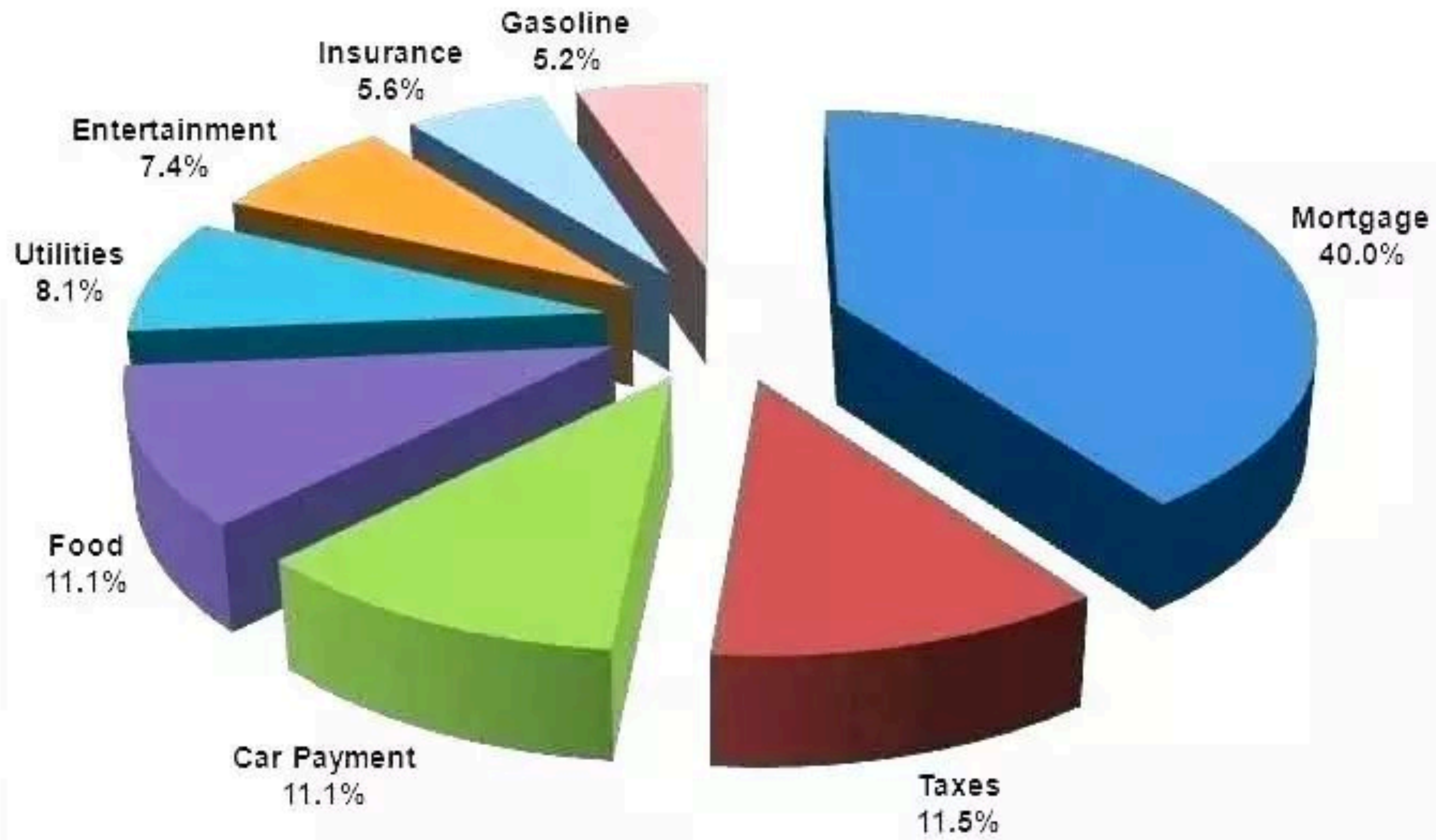




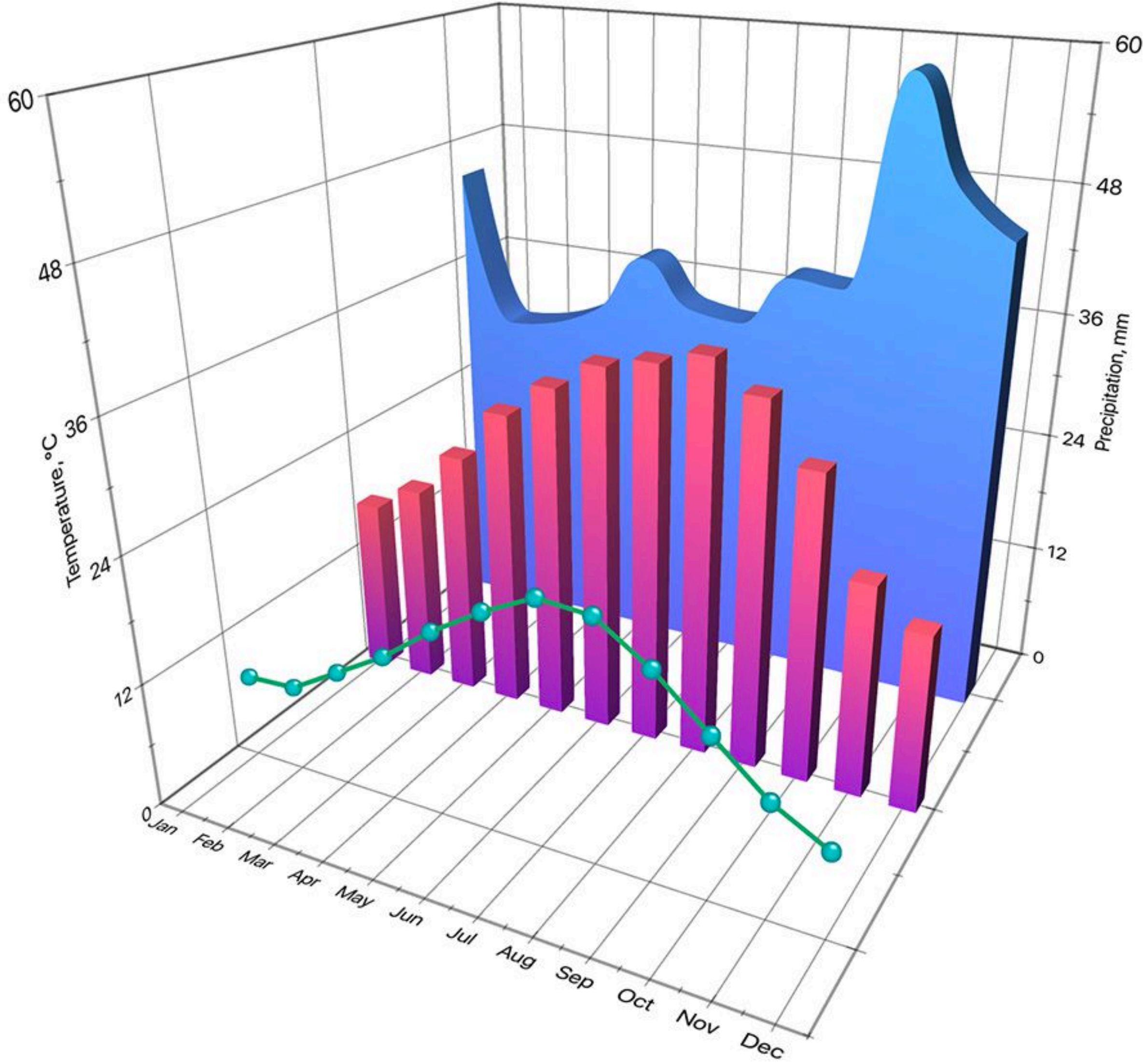
Monthly Sales Summary



Personal Expenses



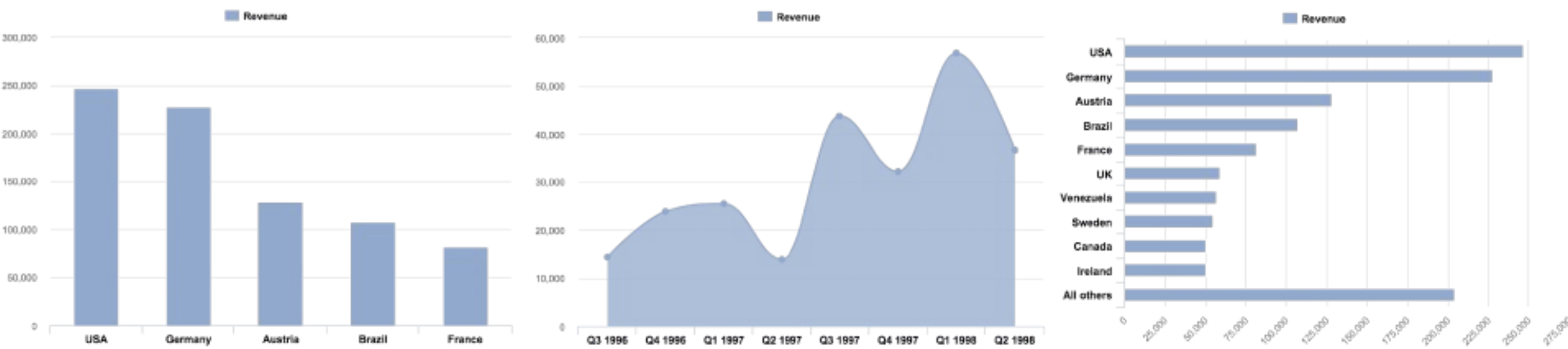
Climate data for London Heathrow (1981–present)



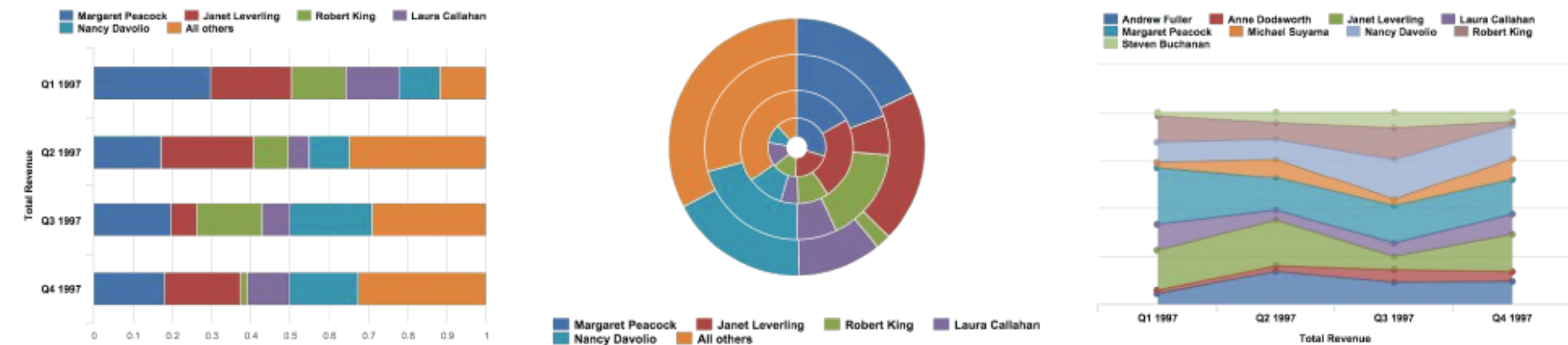
■ Average precipitation, mm ■ Record temp. high, °C ■ Average temp. high, °C

4 Basic Methods of Visual Data Analysis

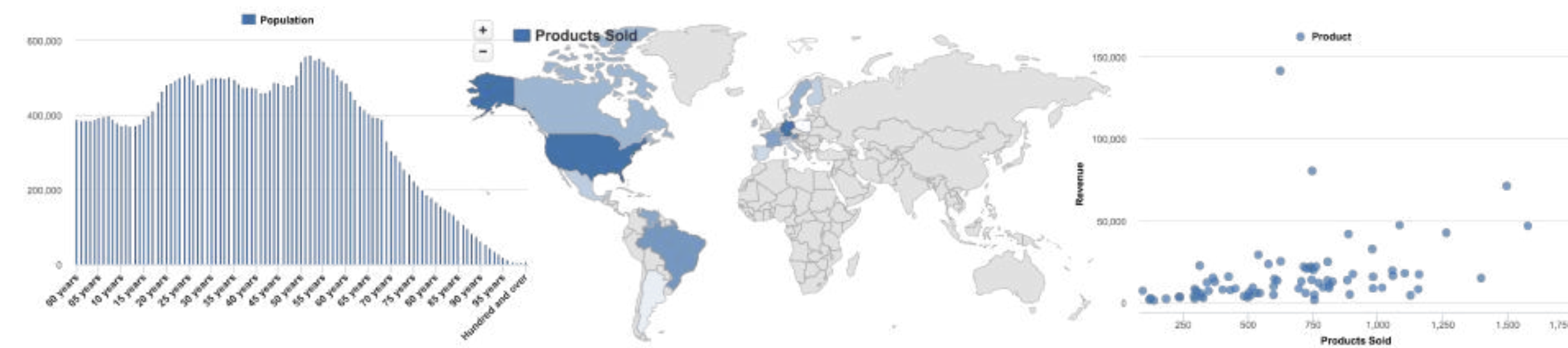
Comparison



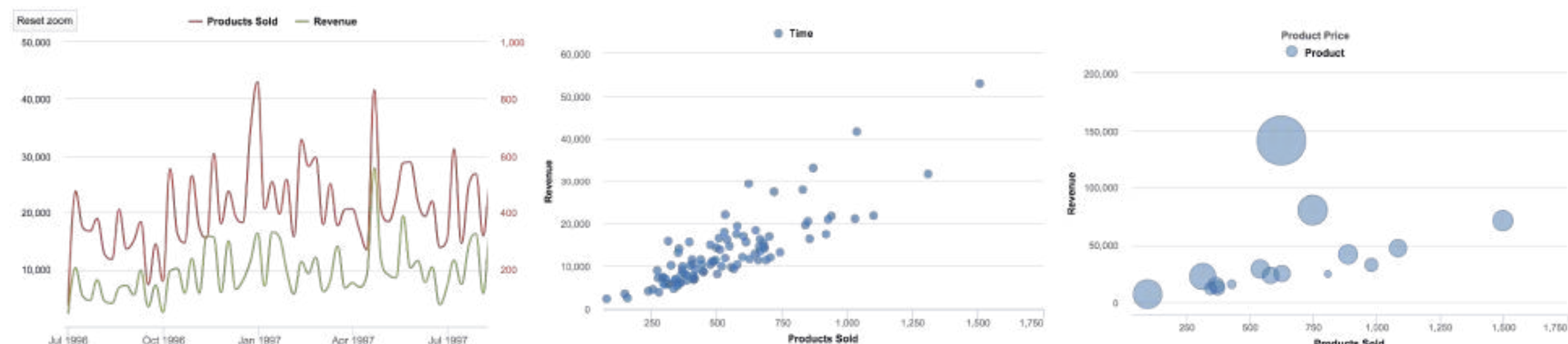
Composition



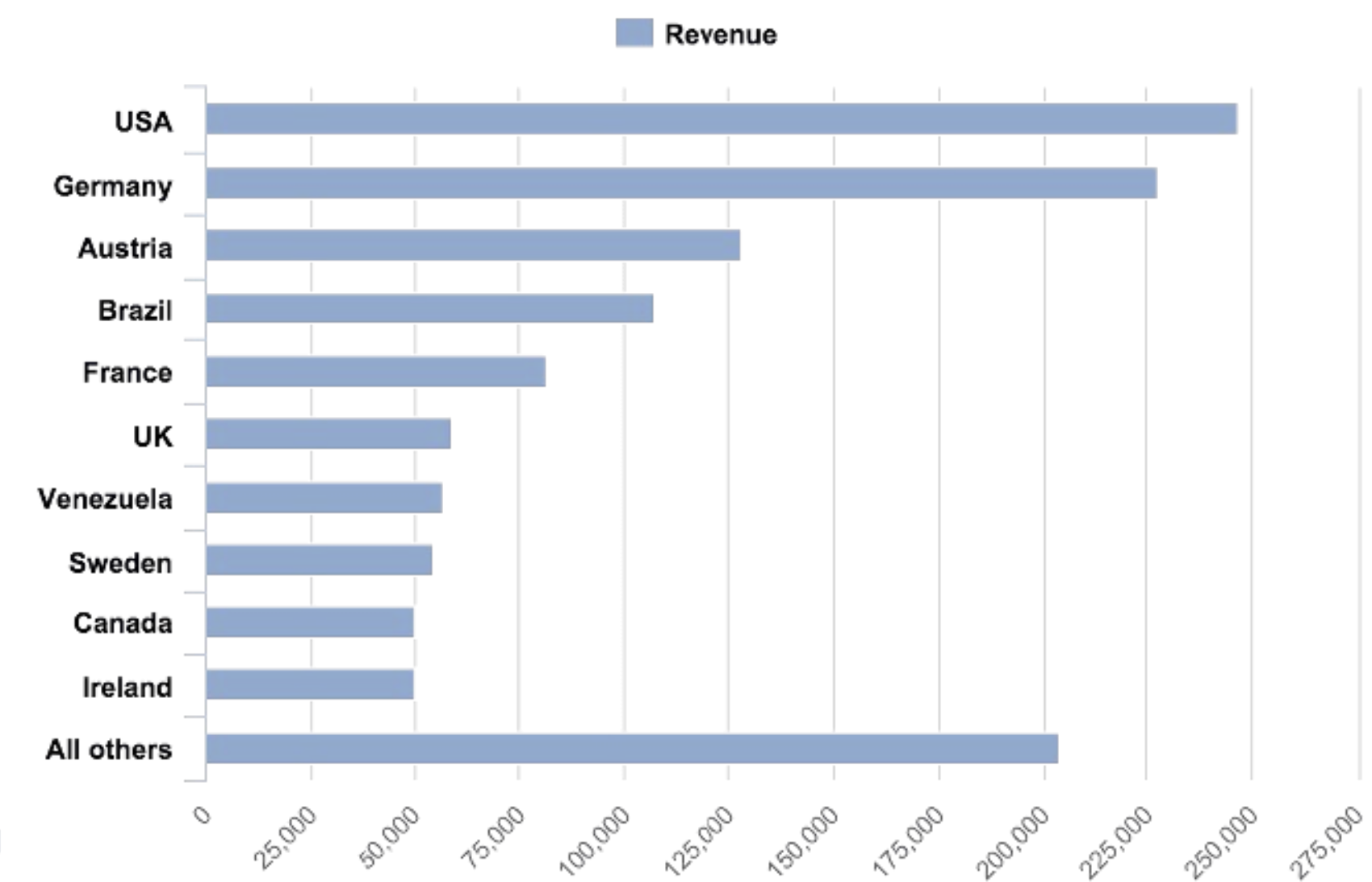
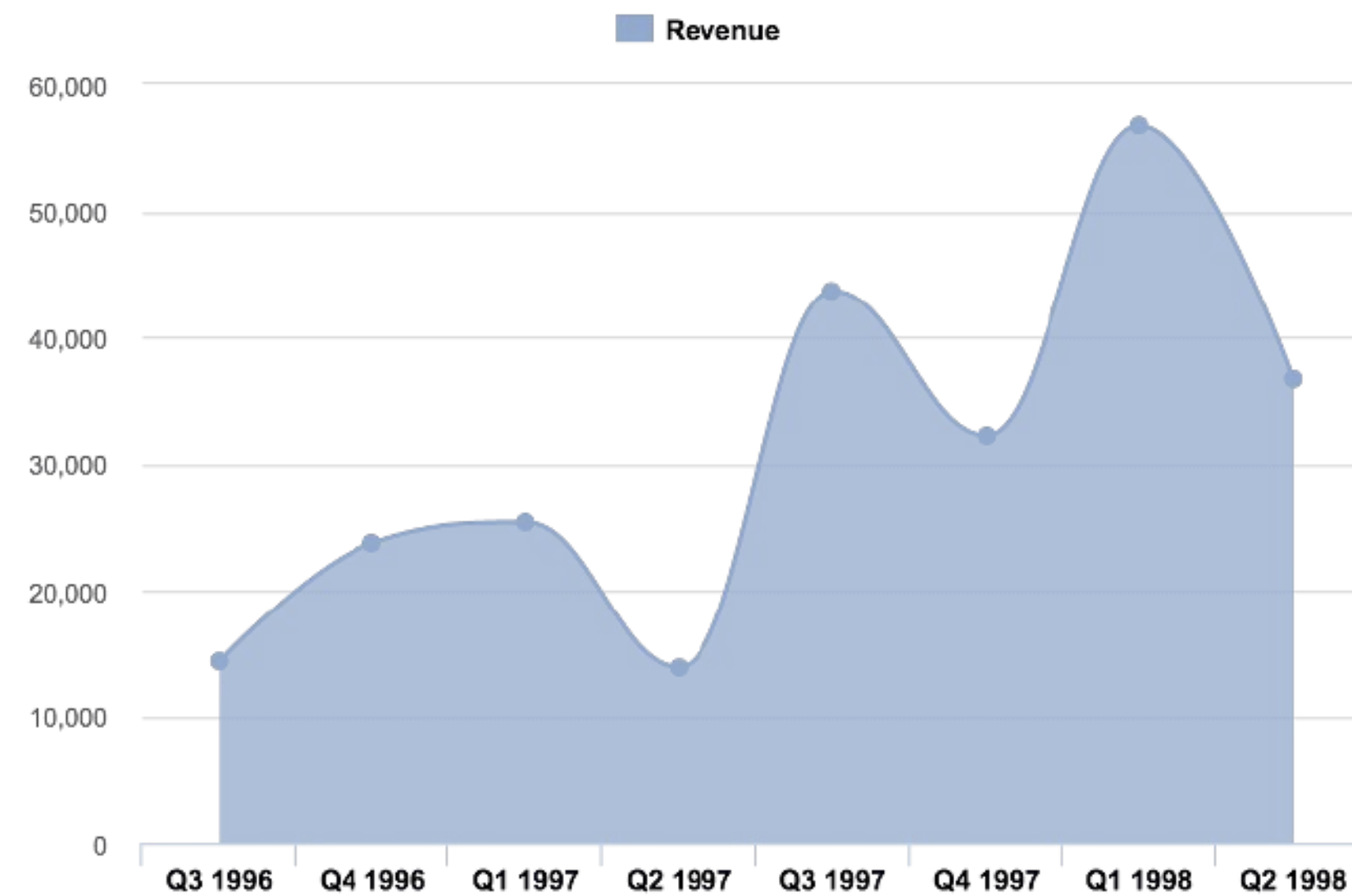
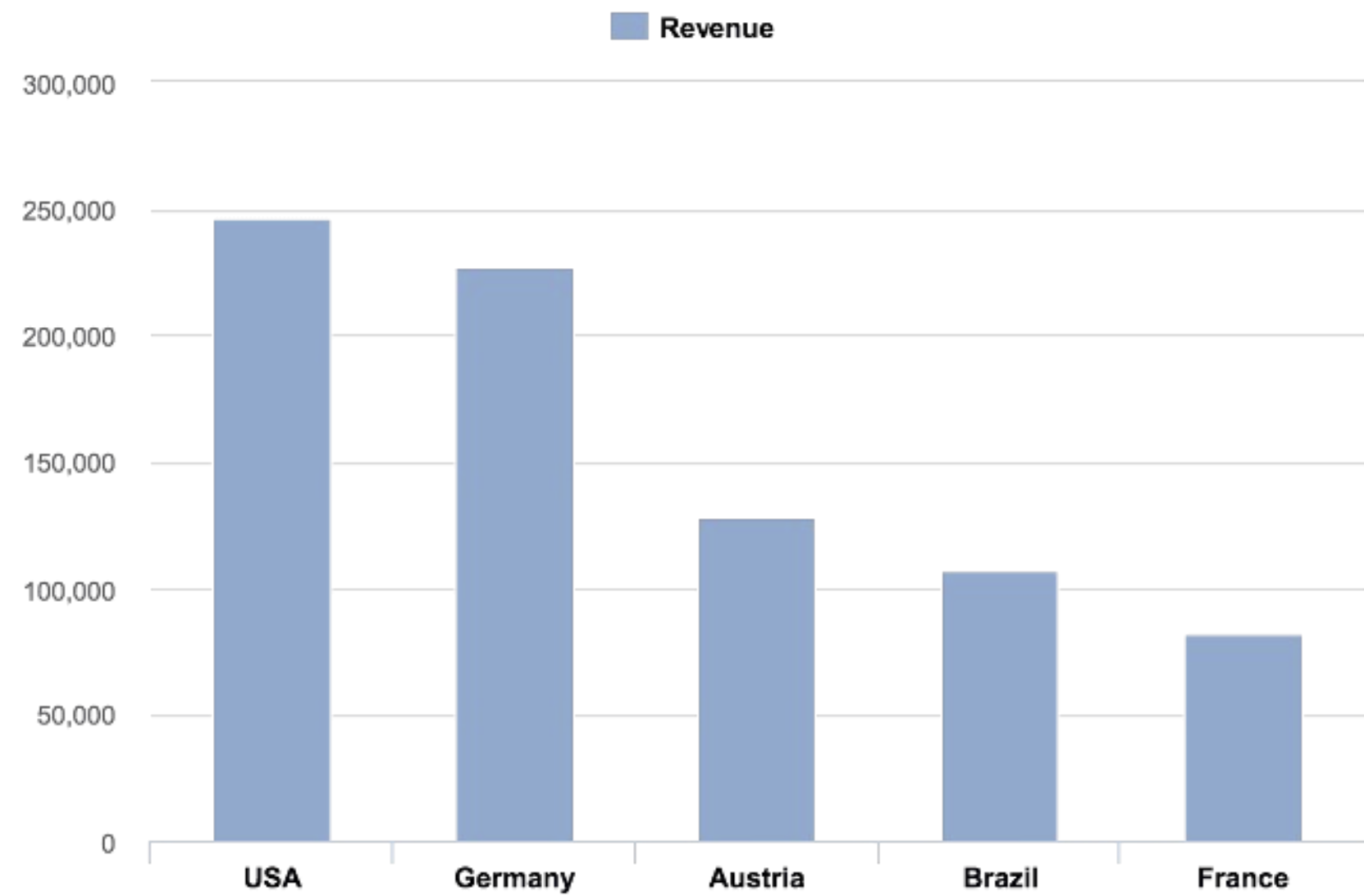
Distribution



Relationship



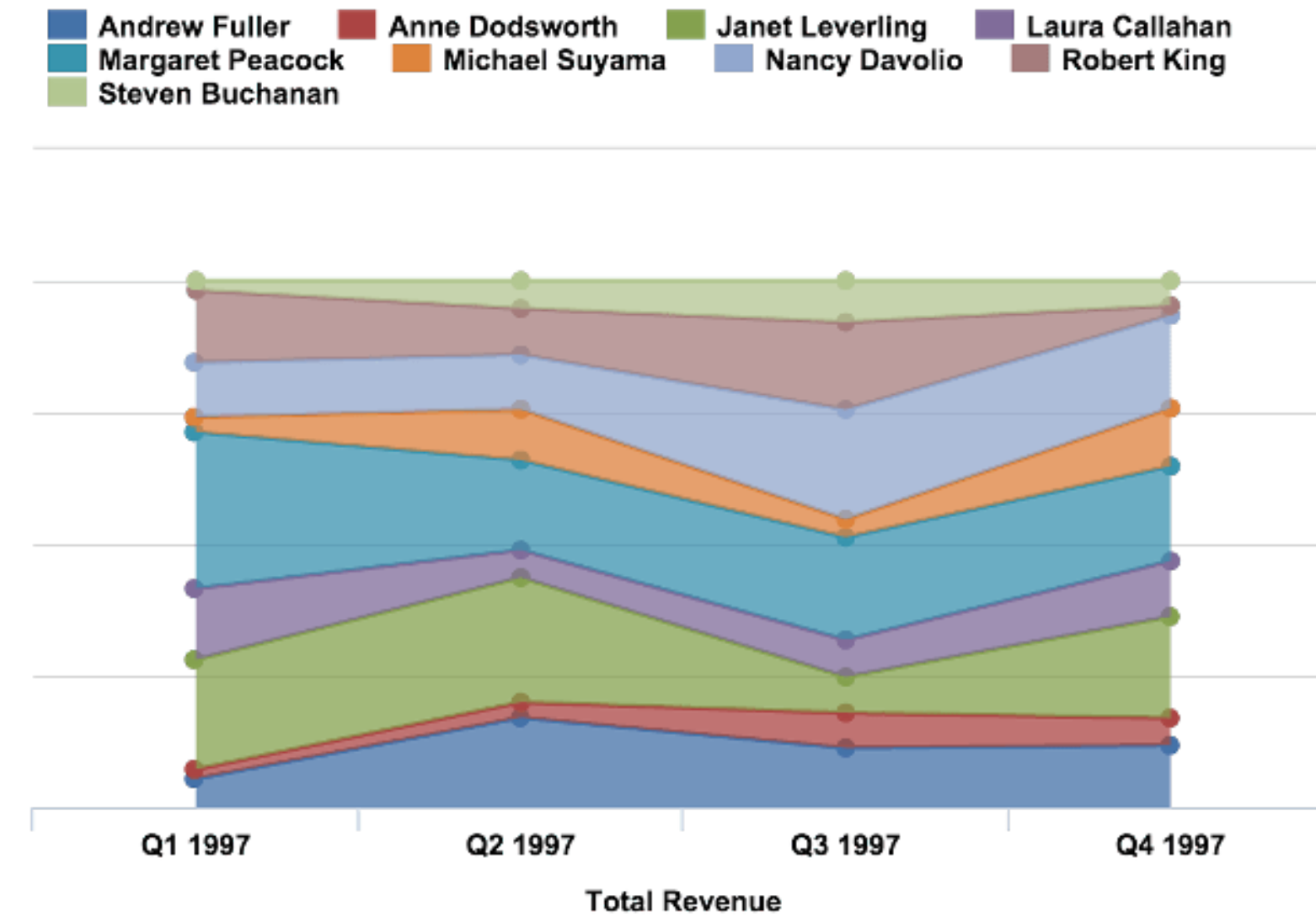
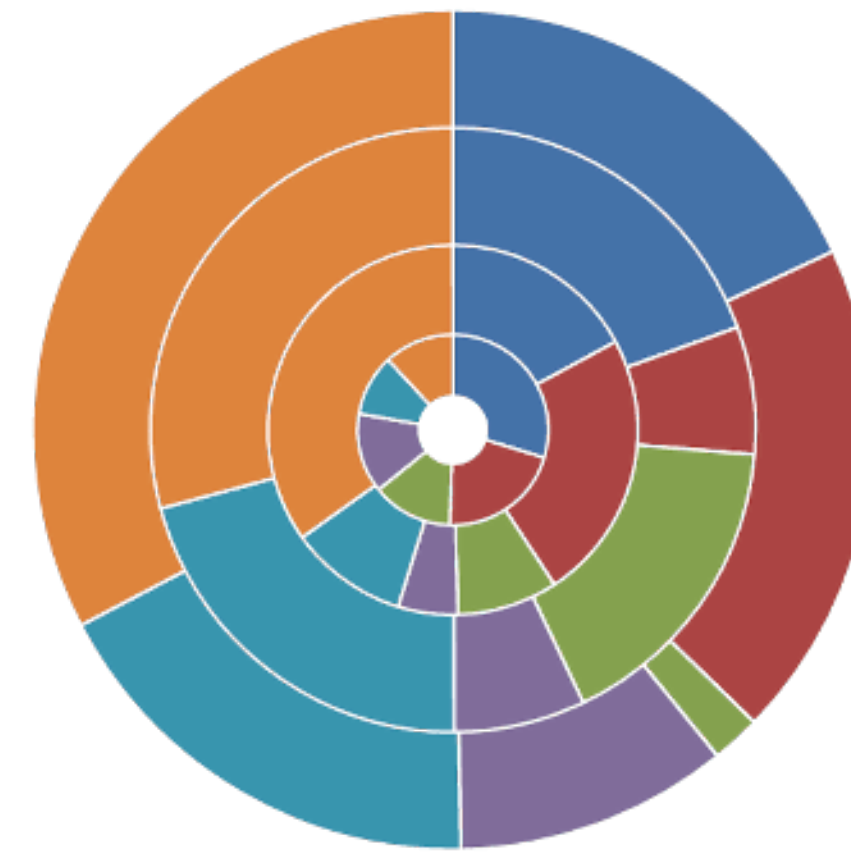
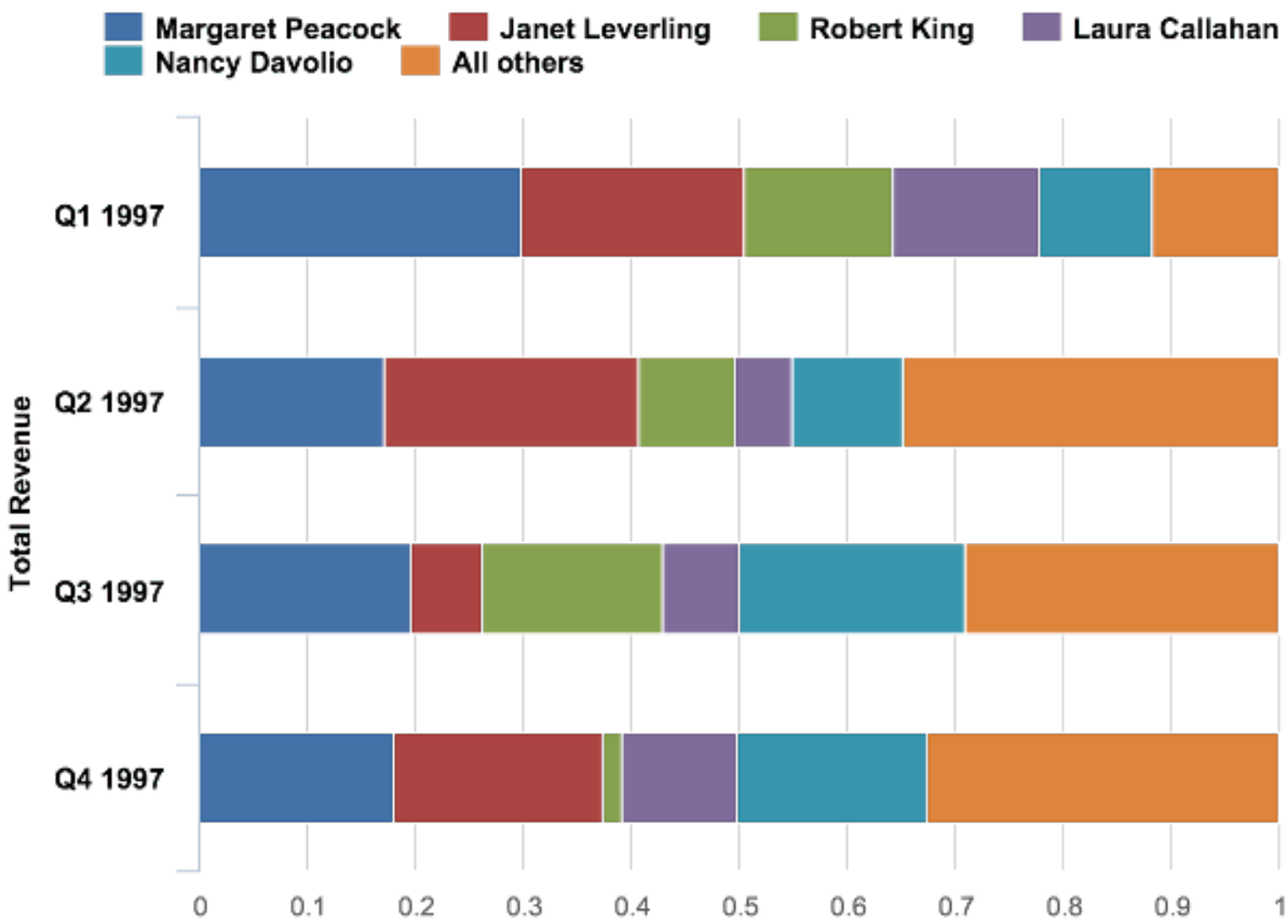
Comparison



- Compare two or more values side by side
- List key values

- Rank values from best to worst or vice versa.
- Show patterns, gaps, spikes, outliers, or trends.

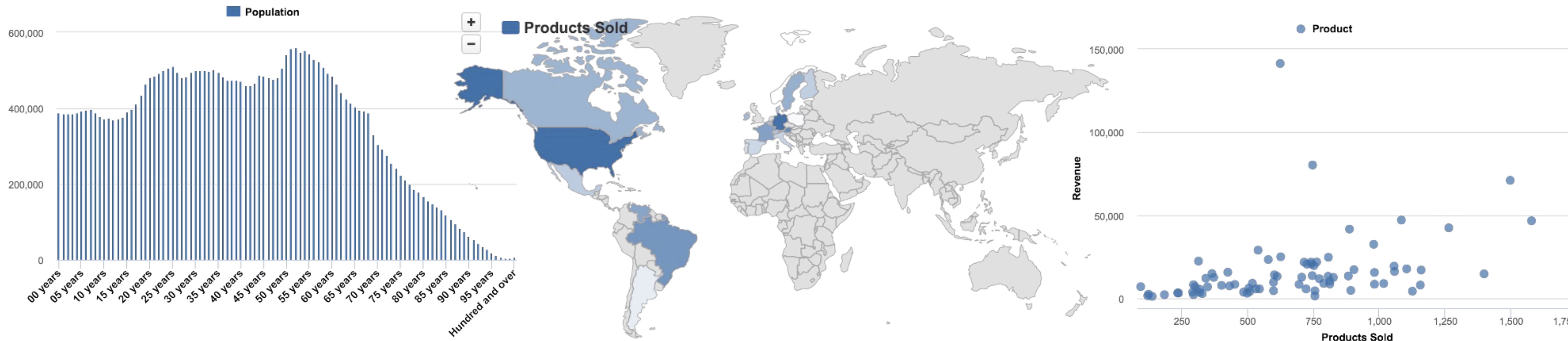
Composition



- Show part to whole relationship.

- Show how a total value can be divided into parts

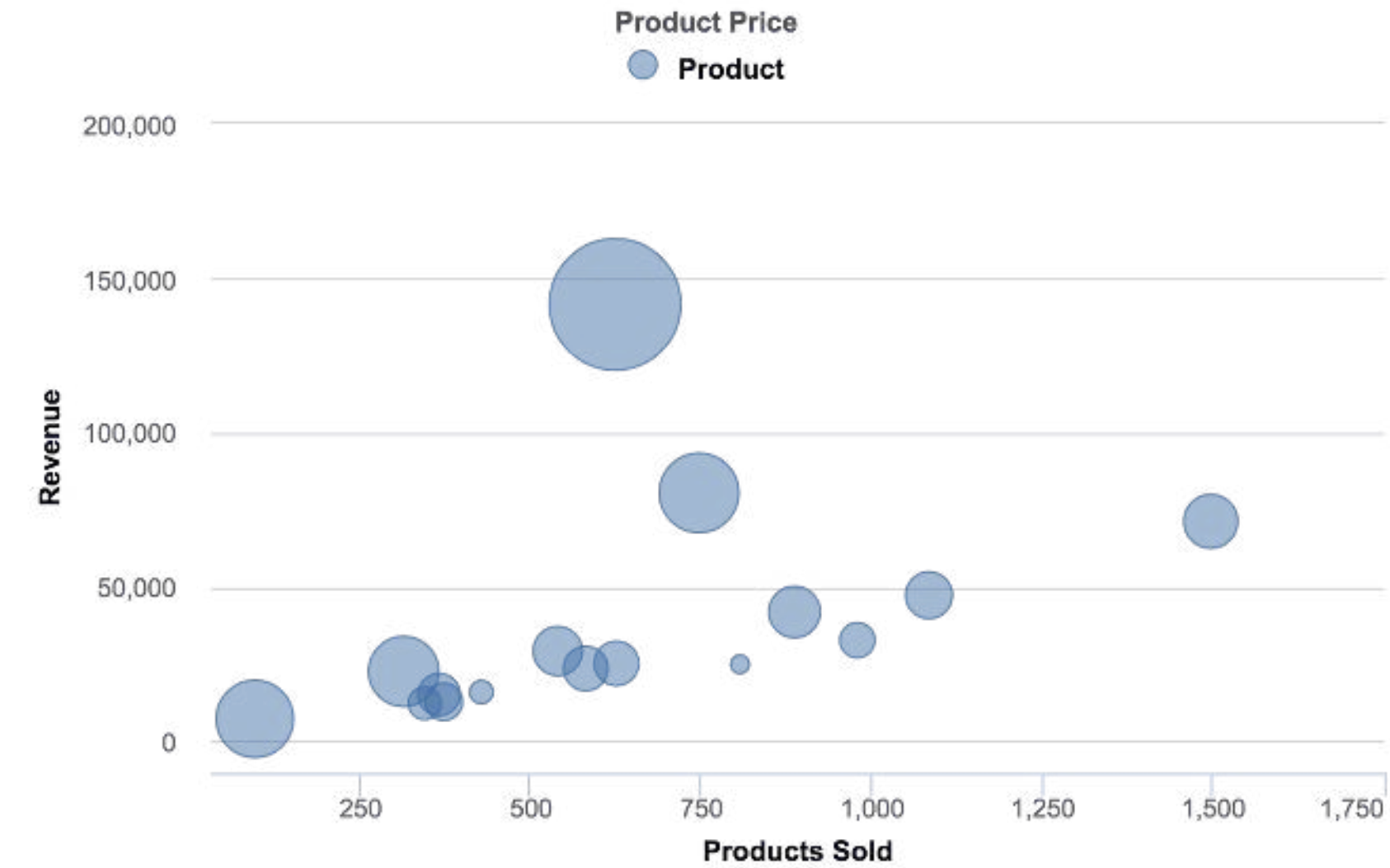
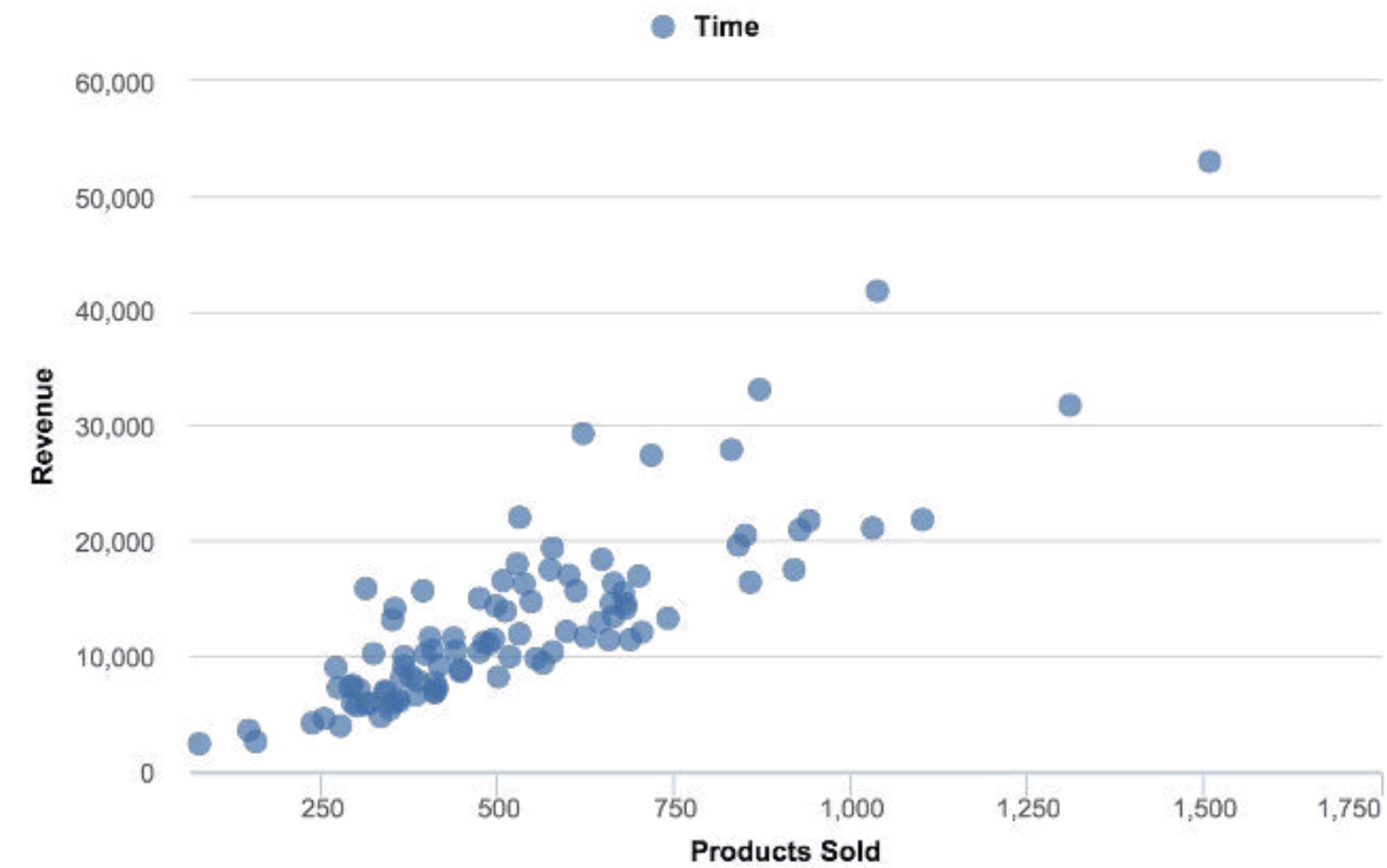
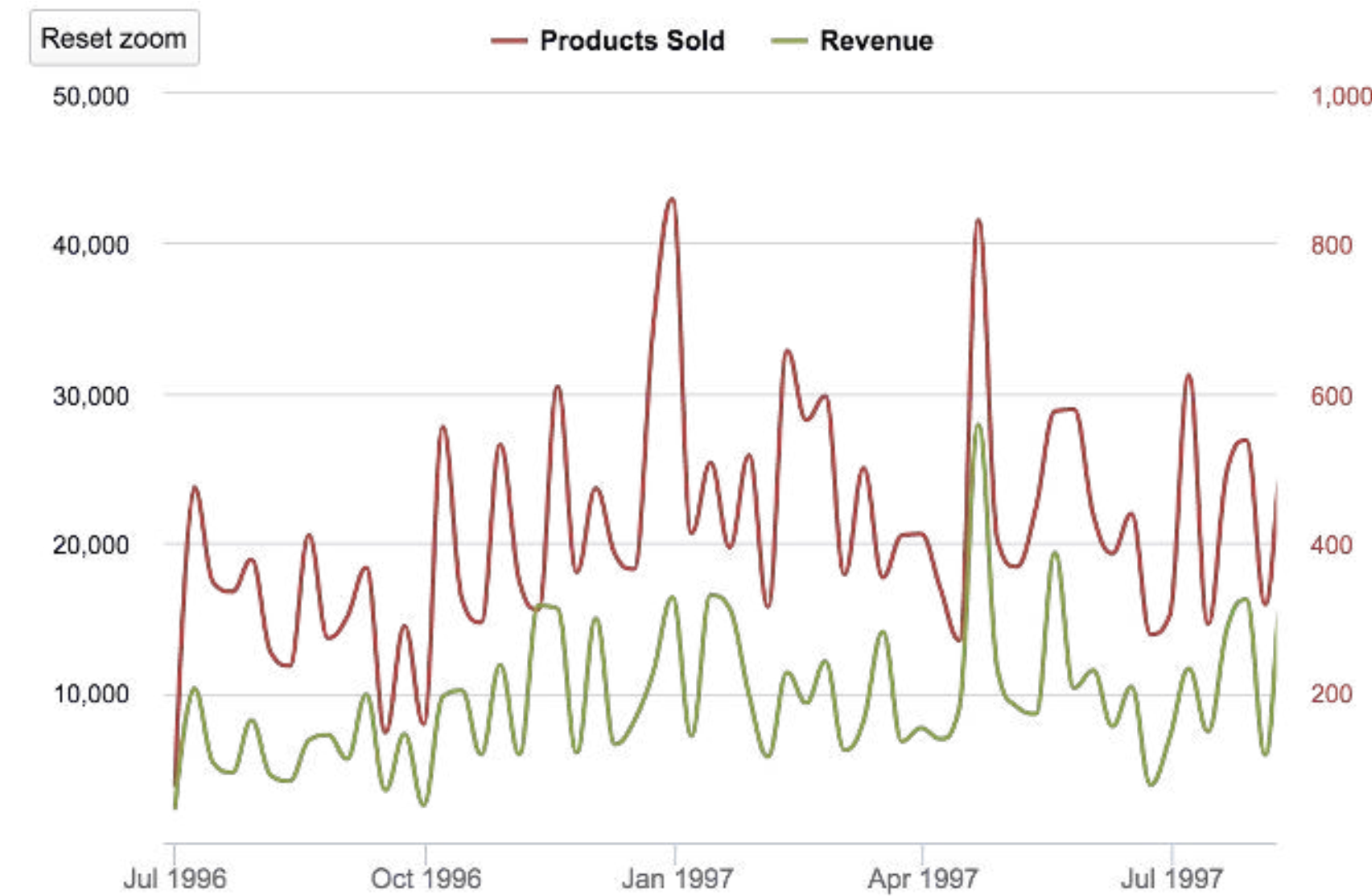
Distribution



- Comparison and Composition.
- Correlations, trends, patterns, shapes, clusters, averages, or outliers.

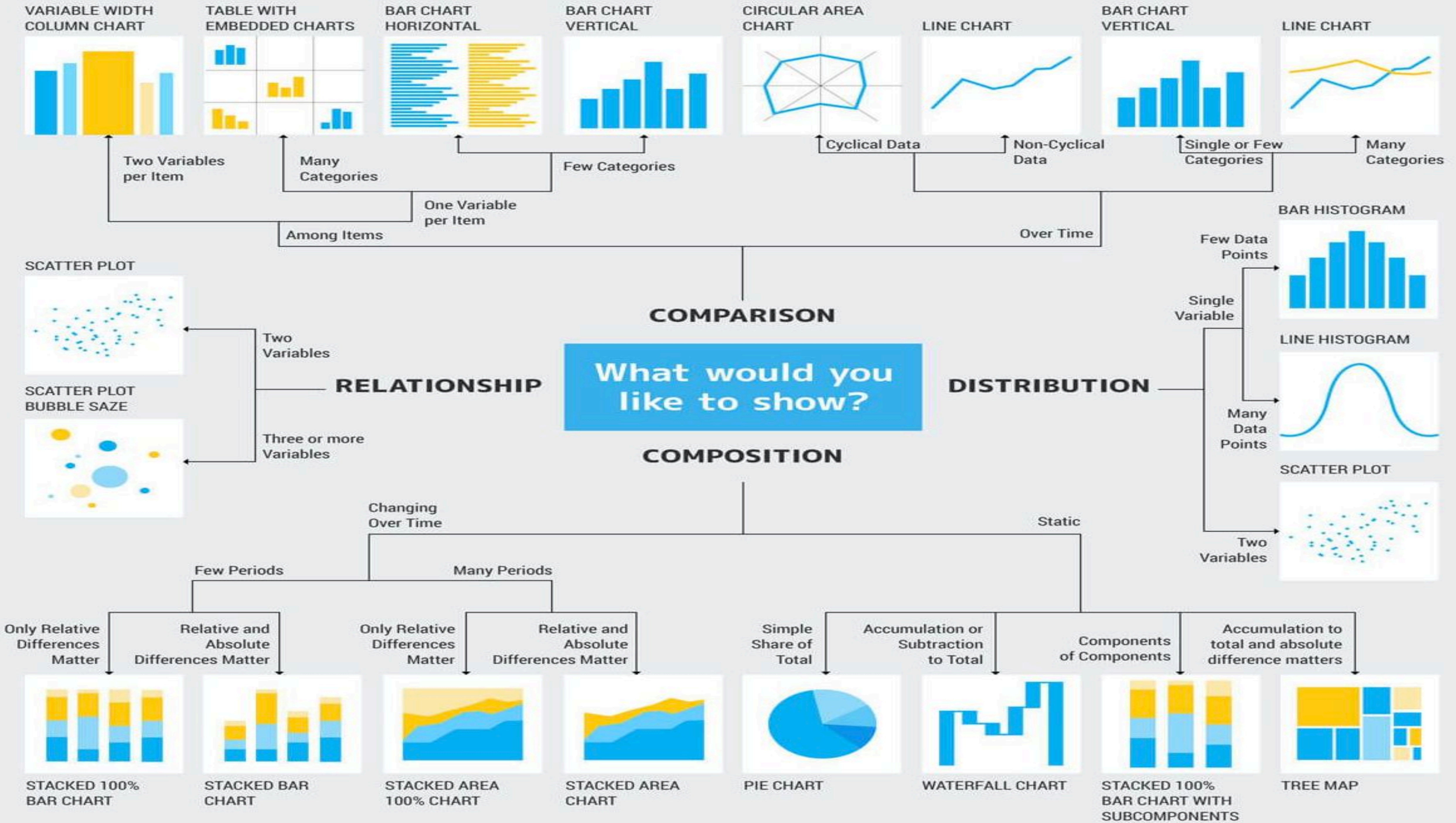
- Deviation or Variance analysis.
- Visualize related or unrelated data points.

Relationship

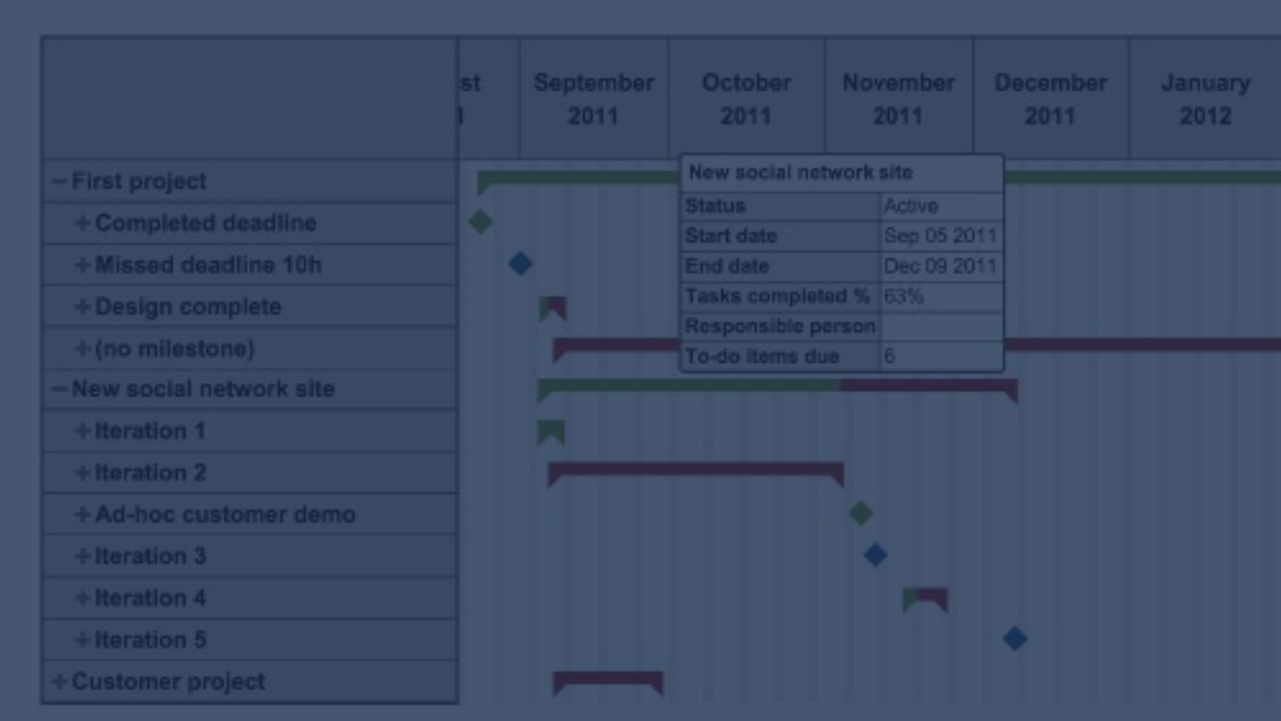
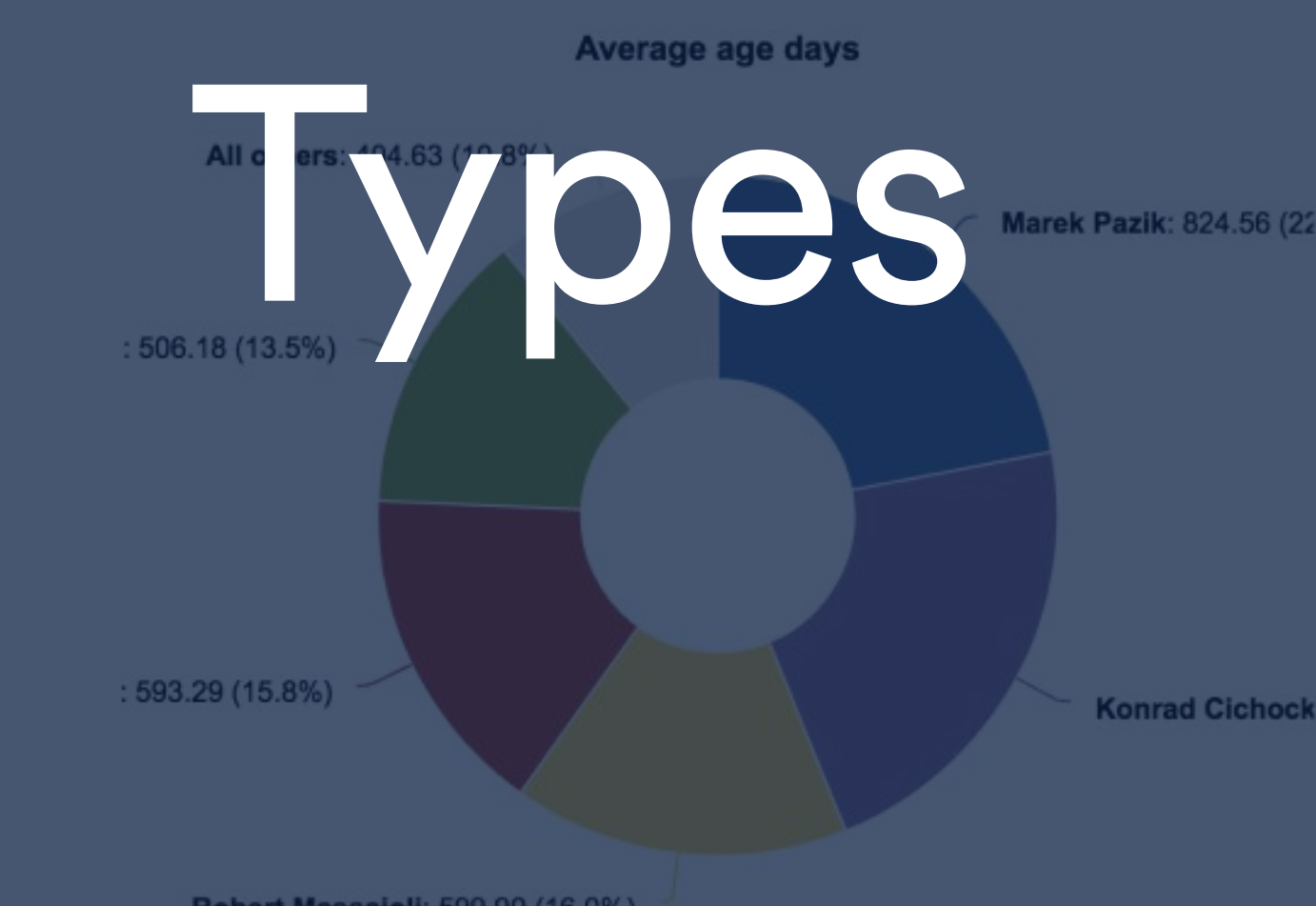
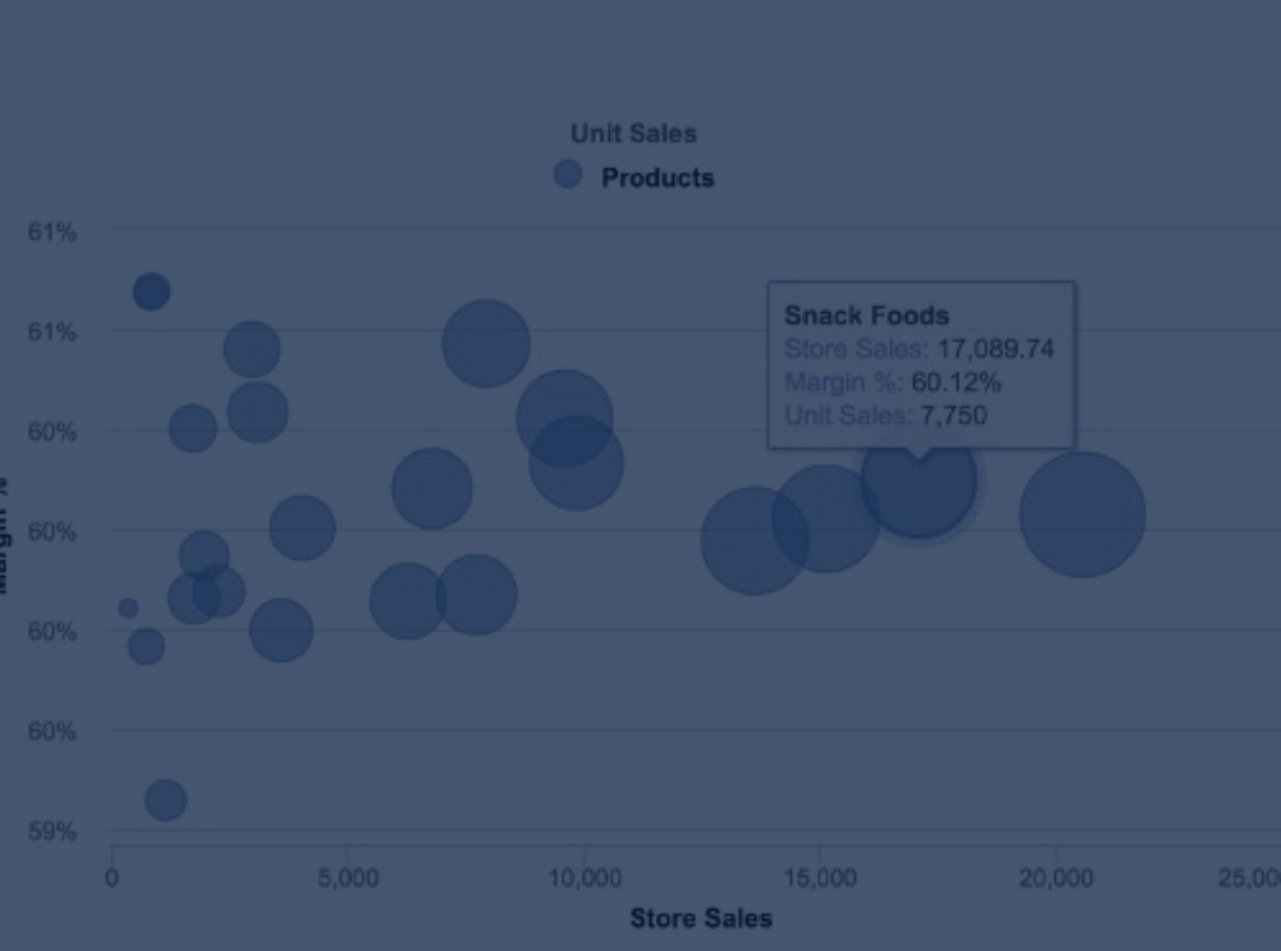
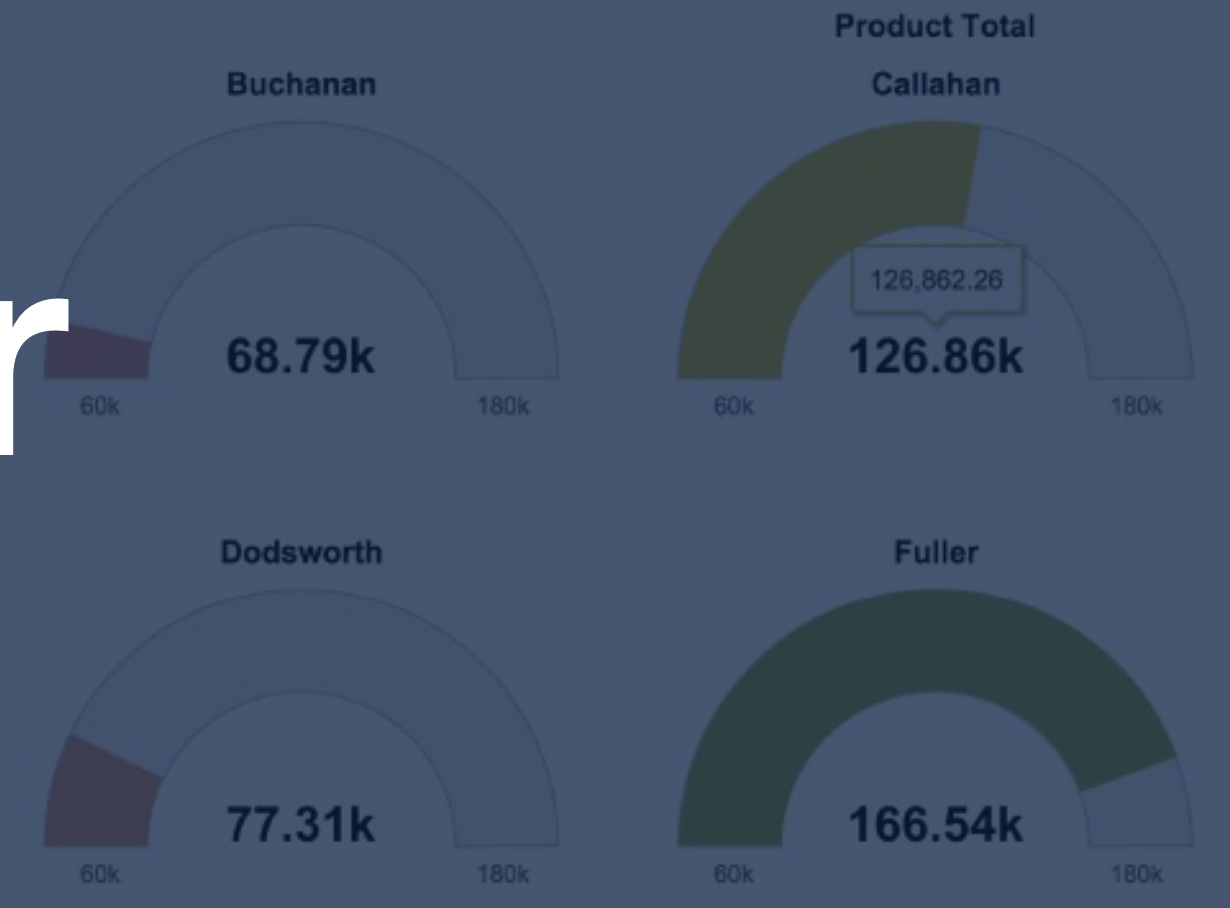
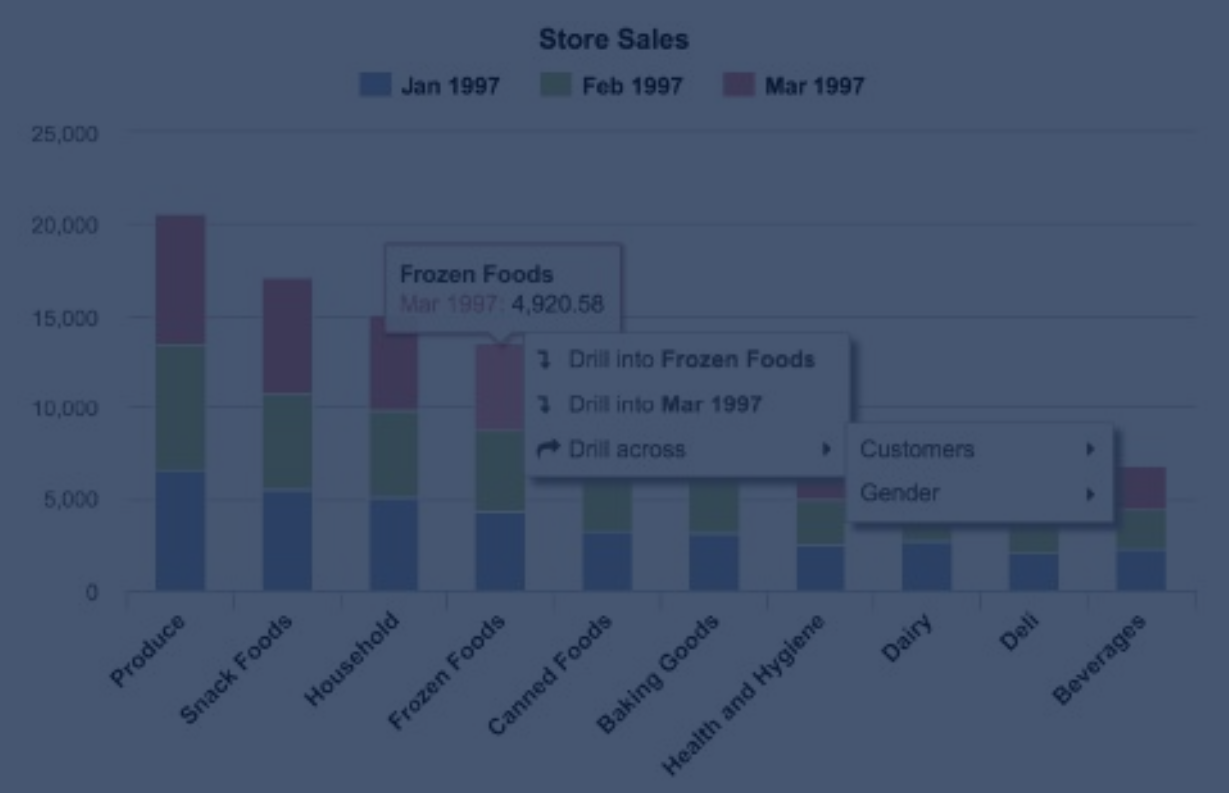


- Show the relationship, correlation, or connection.

- Find correlations, trends, patterns, clusters, averages, or outliers.



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Do's & Don'ts for Different Chart Types

Table Charts

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- ↩ Drill across ▶
- ➔ Select this
- 🗑 Remove
- ⬆ Order by ▶
- ▼ Top rows ▶
- ▲ Bottom rows ▶
- ⏴ Filter rows ▶
- 🔧 Cell formatting

- Gender ▶
- Products ▶
- Time ▶

- Year
- Quarter
- Month
- Day
- Weekly**
- Year
- Week
- Day
- Fiscal**
- Year
- Quarter
- Month
- Day

USE TABLES

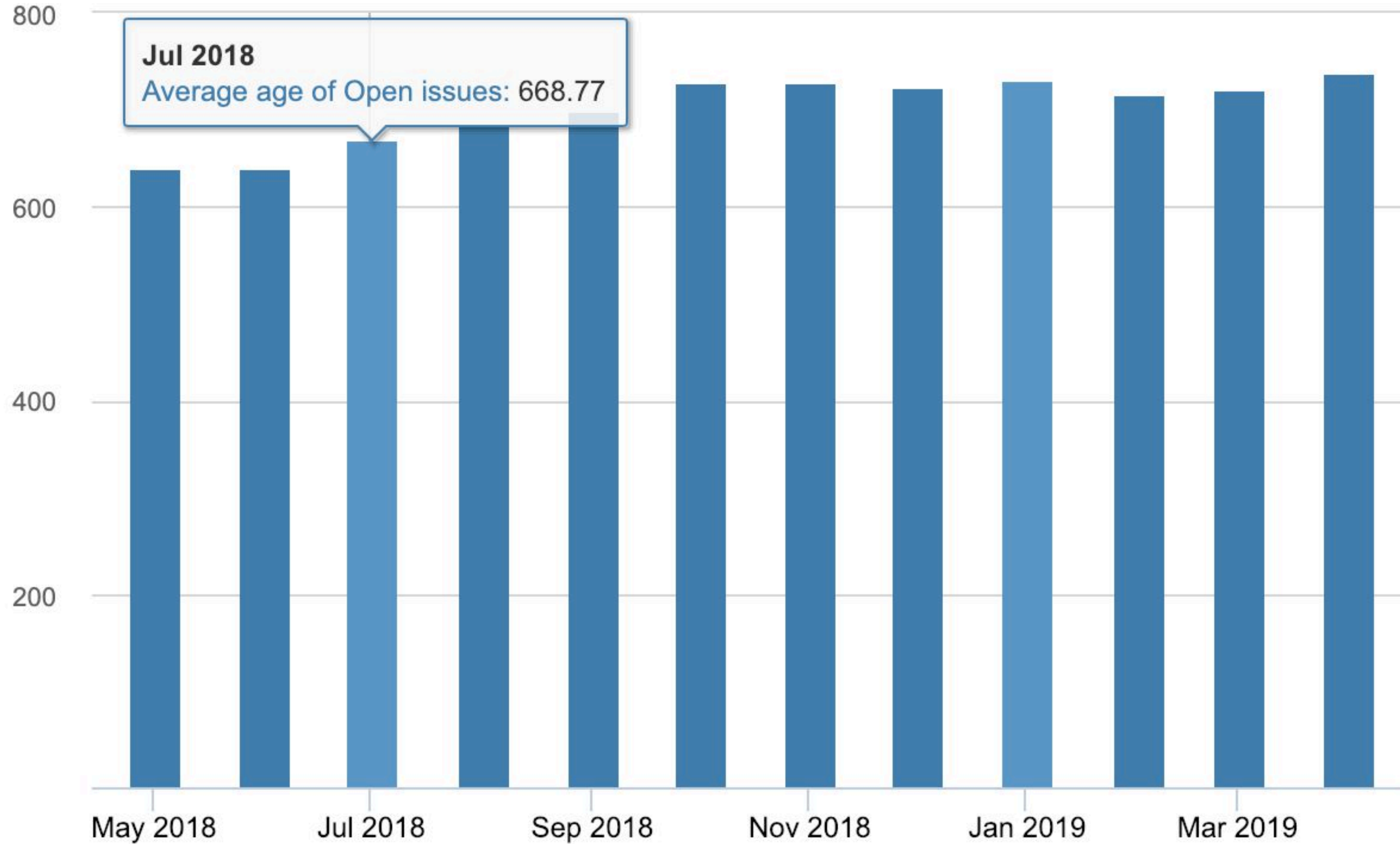
- You need to compare or look up individual values.
- You require precise values.
- Values involve multiple units of measure.
- The data has to communicate quantitative information, but not trends.

USE CHARTS

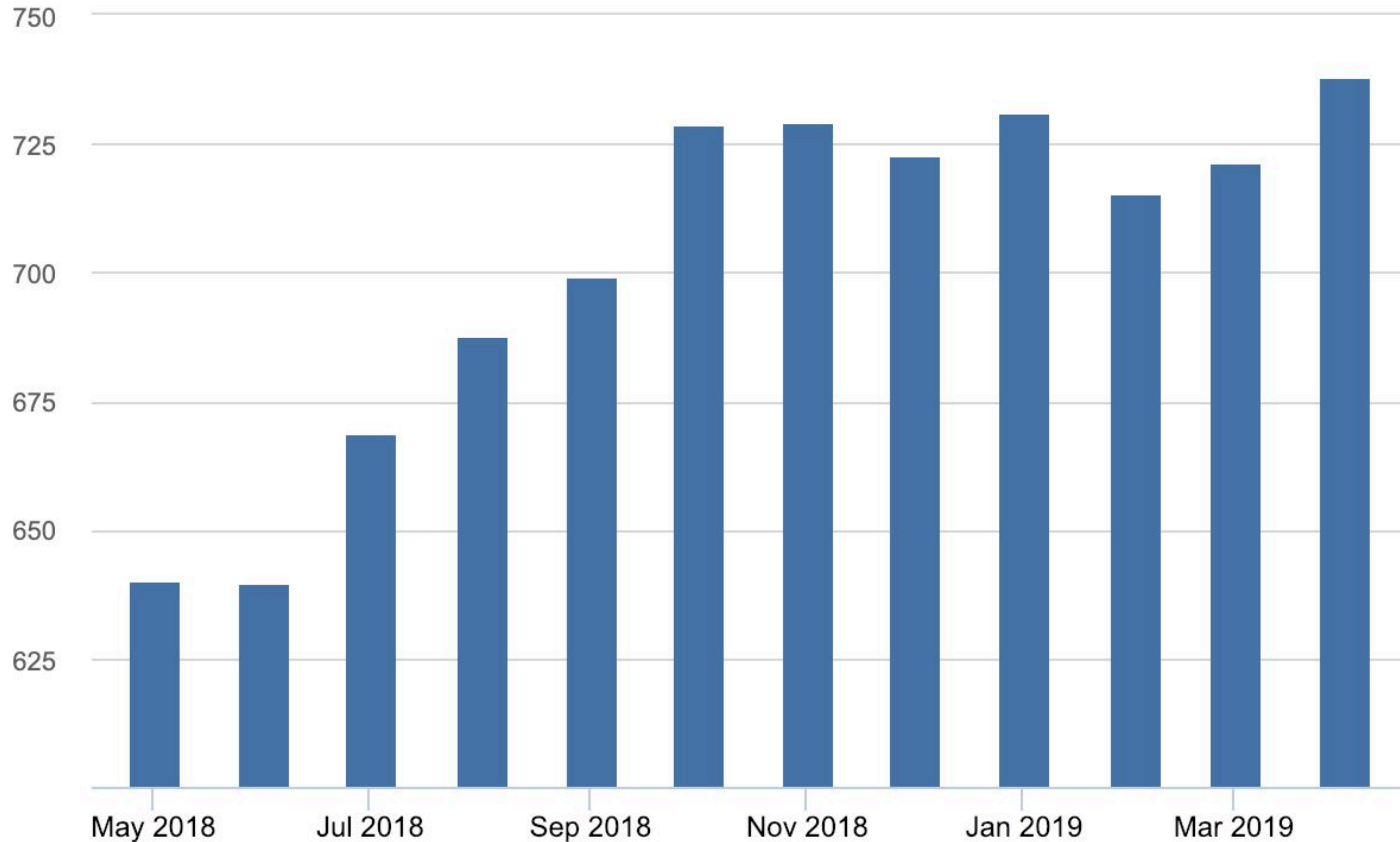
- You want to convey a message that is contained in the shape of the data.
- The chart is used to show a relationship between many values.

Column Charts

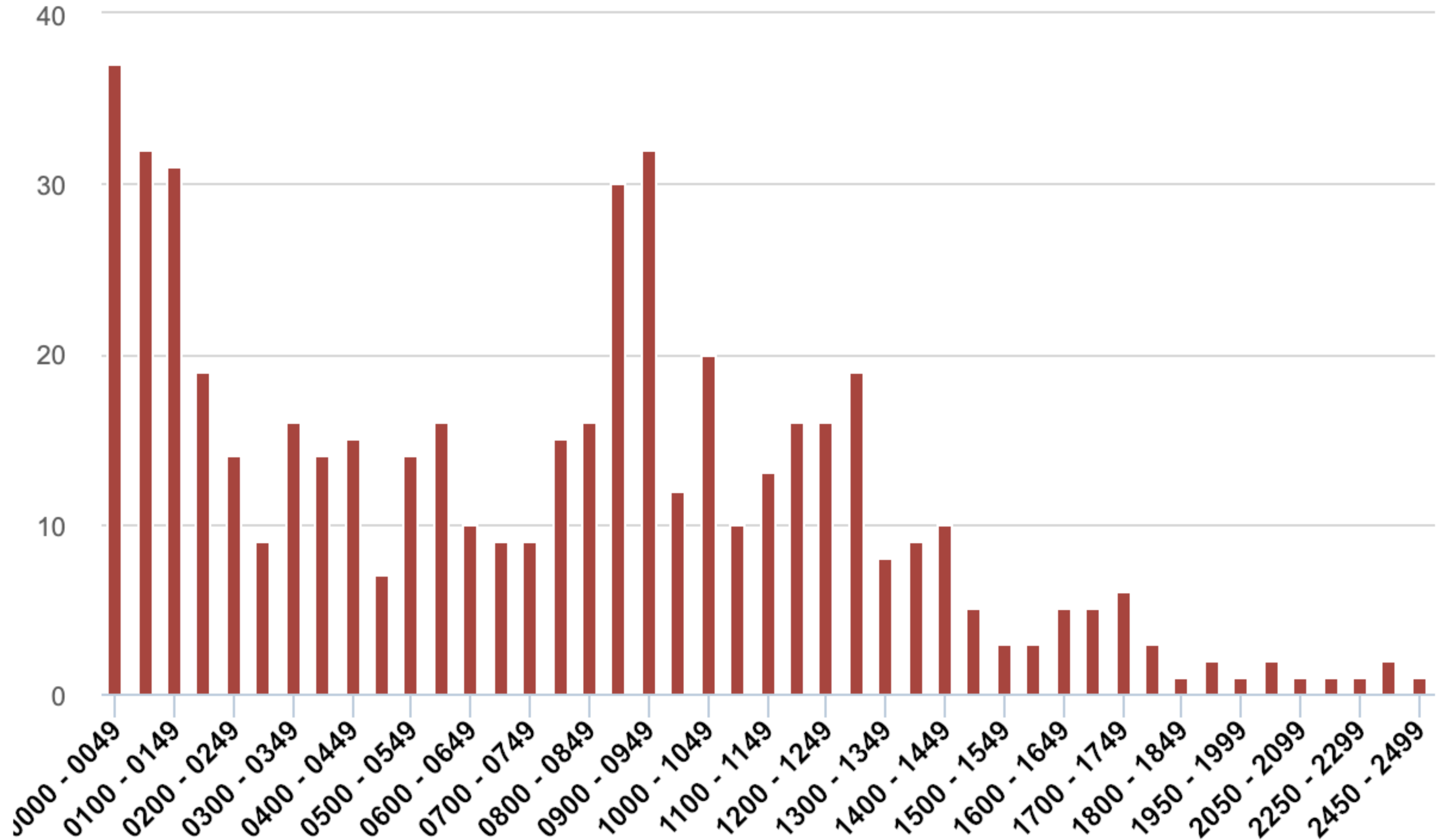
■ Average age of Open issues



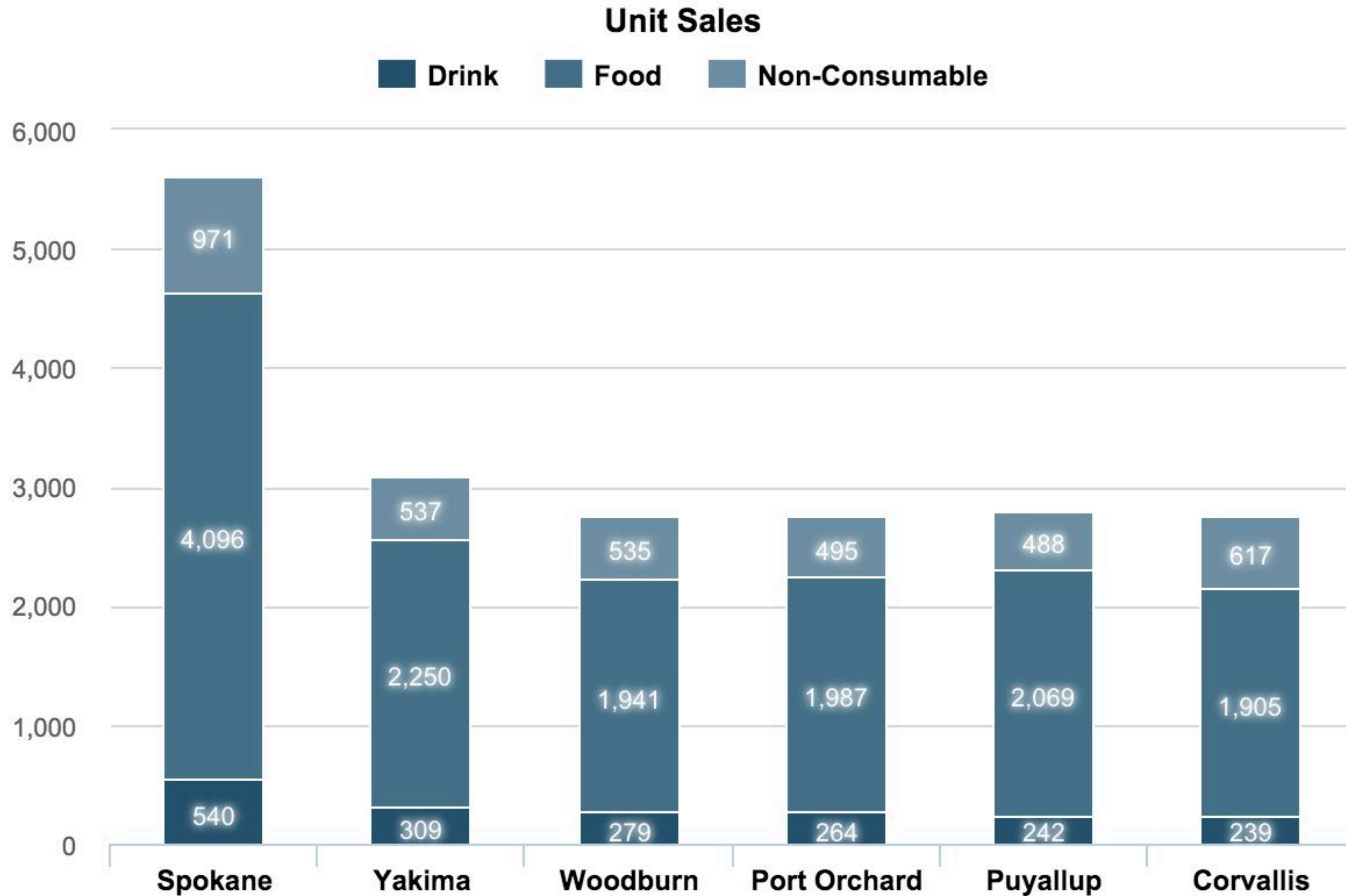
Column Charts Bad Usage



Column Histogram Charts



Stacked Column Charts



DO'S

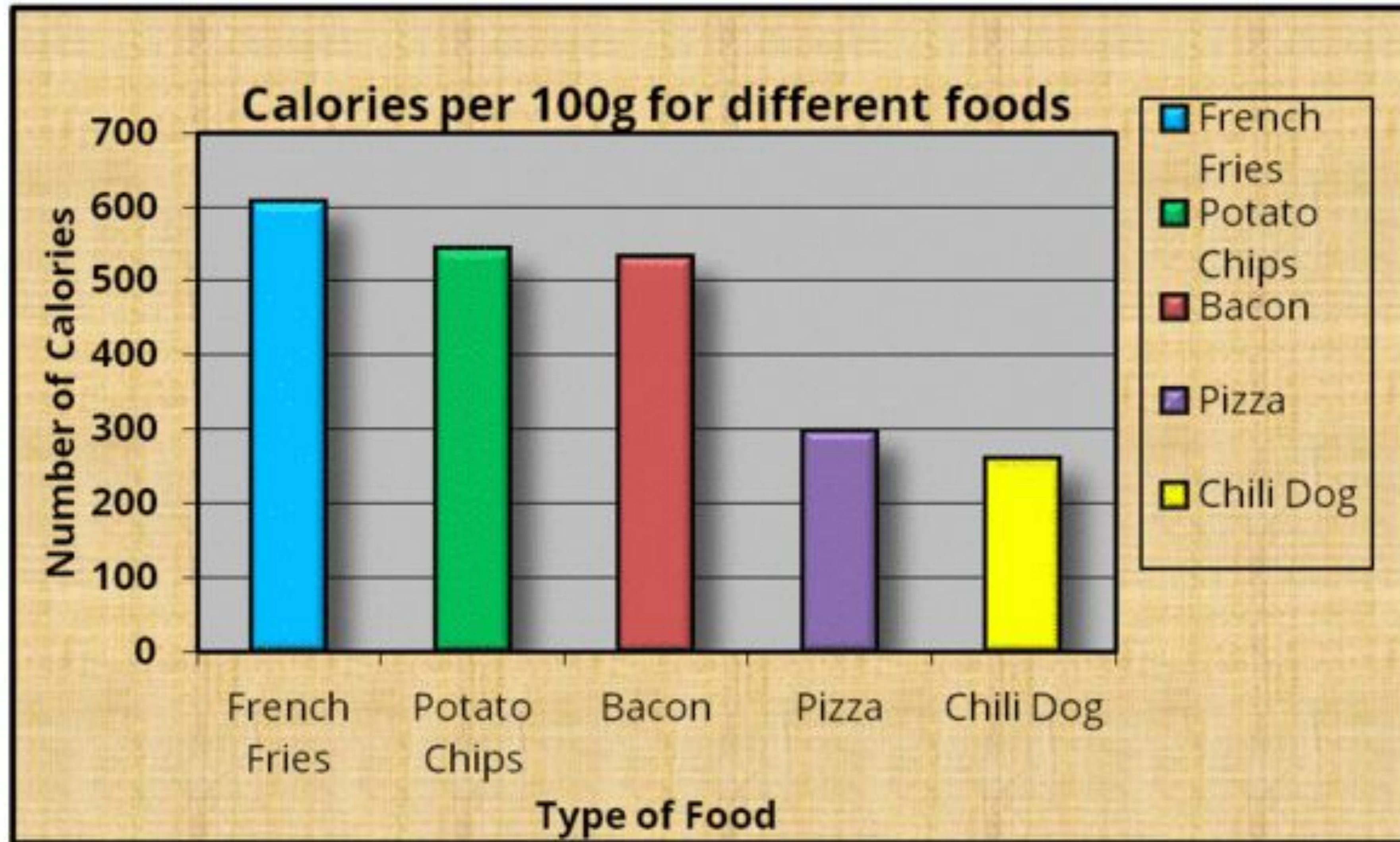
- Compare of up to 5-7 categories.
- Time dimensions on the horizontal axis.
- Time from left to right.
- Value axis must start at zero.

DON'TS

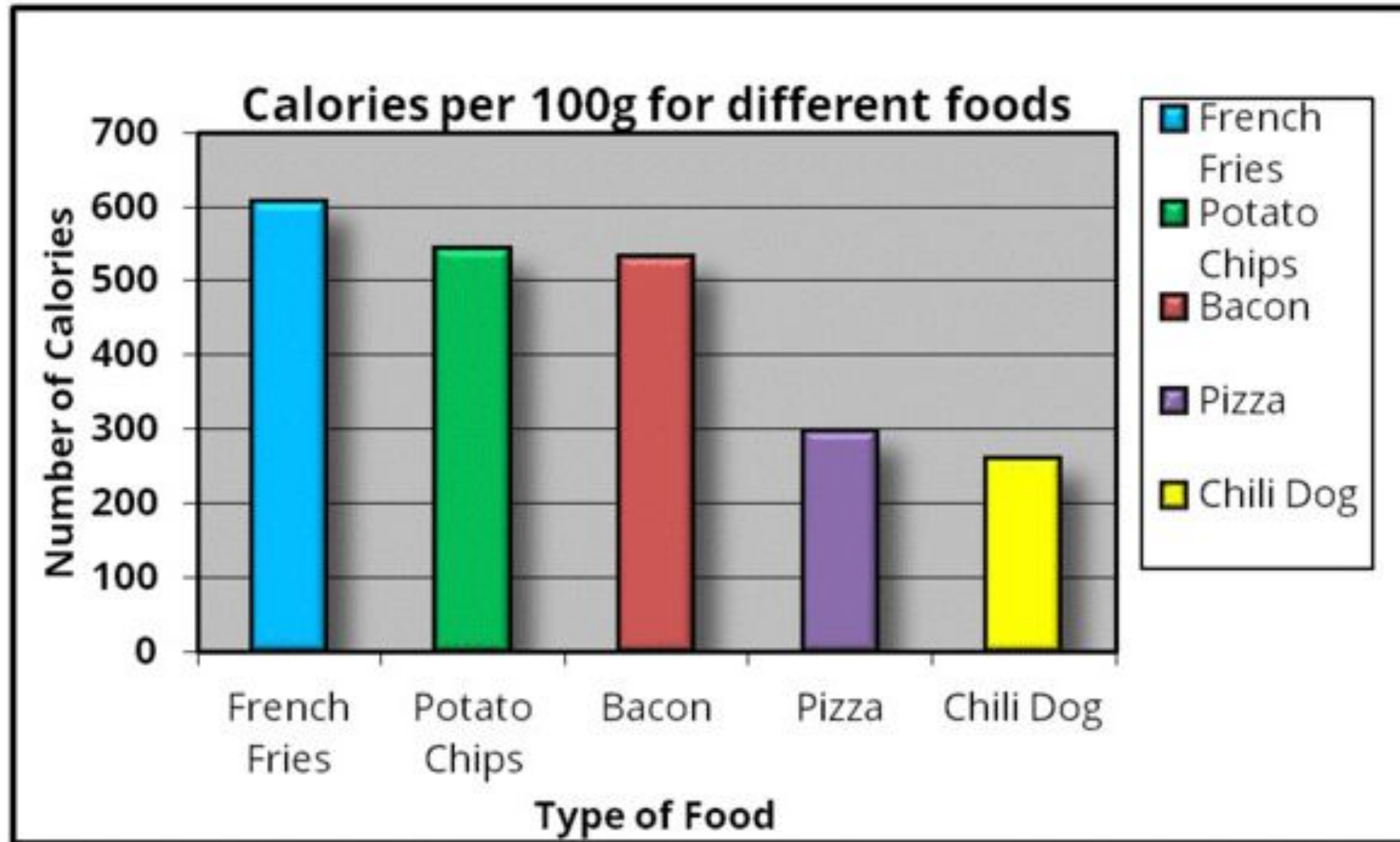
- More than 7 categories
- Time dimension on Vertical axis
- Reorder chronological data charts.
- Numerical starts at a non-zero base.
- Using pattern lines or fills.

Remove
to improve
(the **data-ink** ratio)

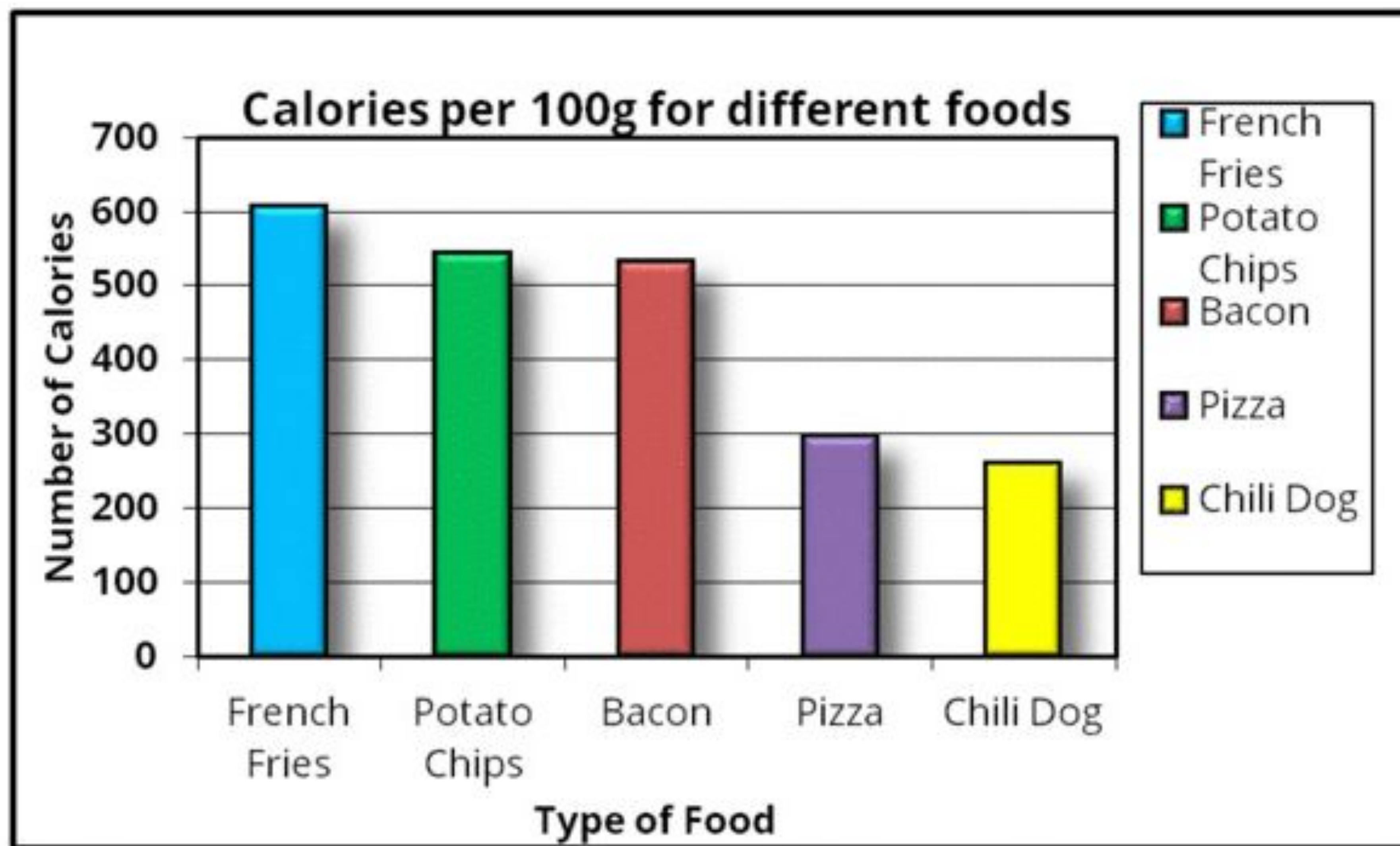
Remove backgrounds



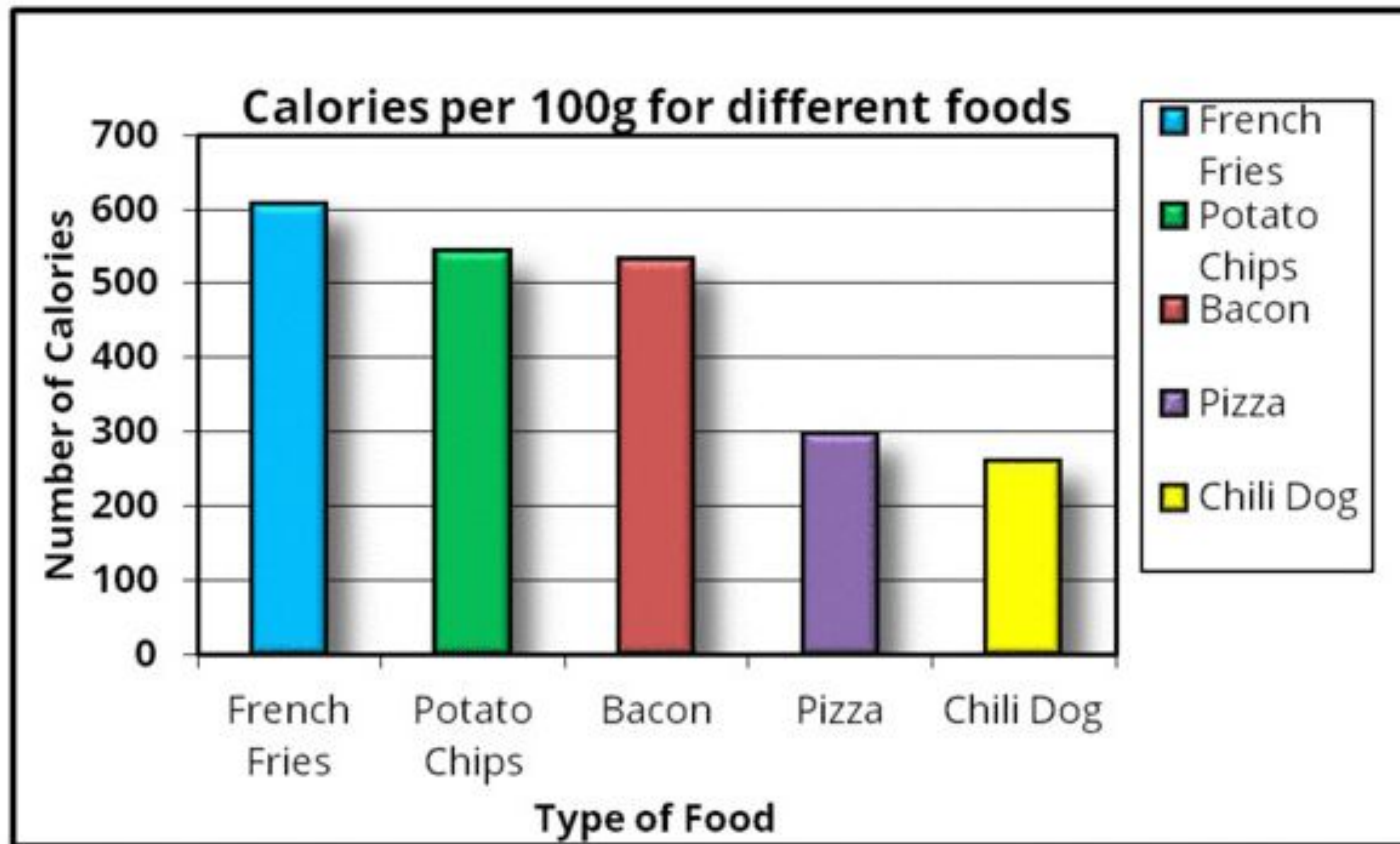
Remove backgrounds



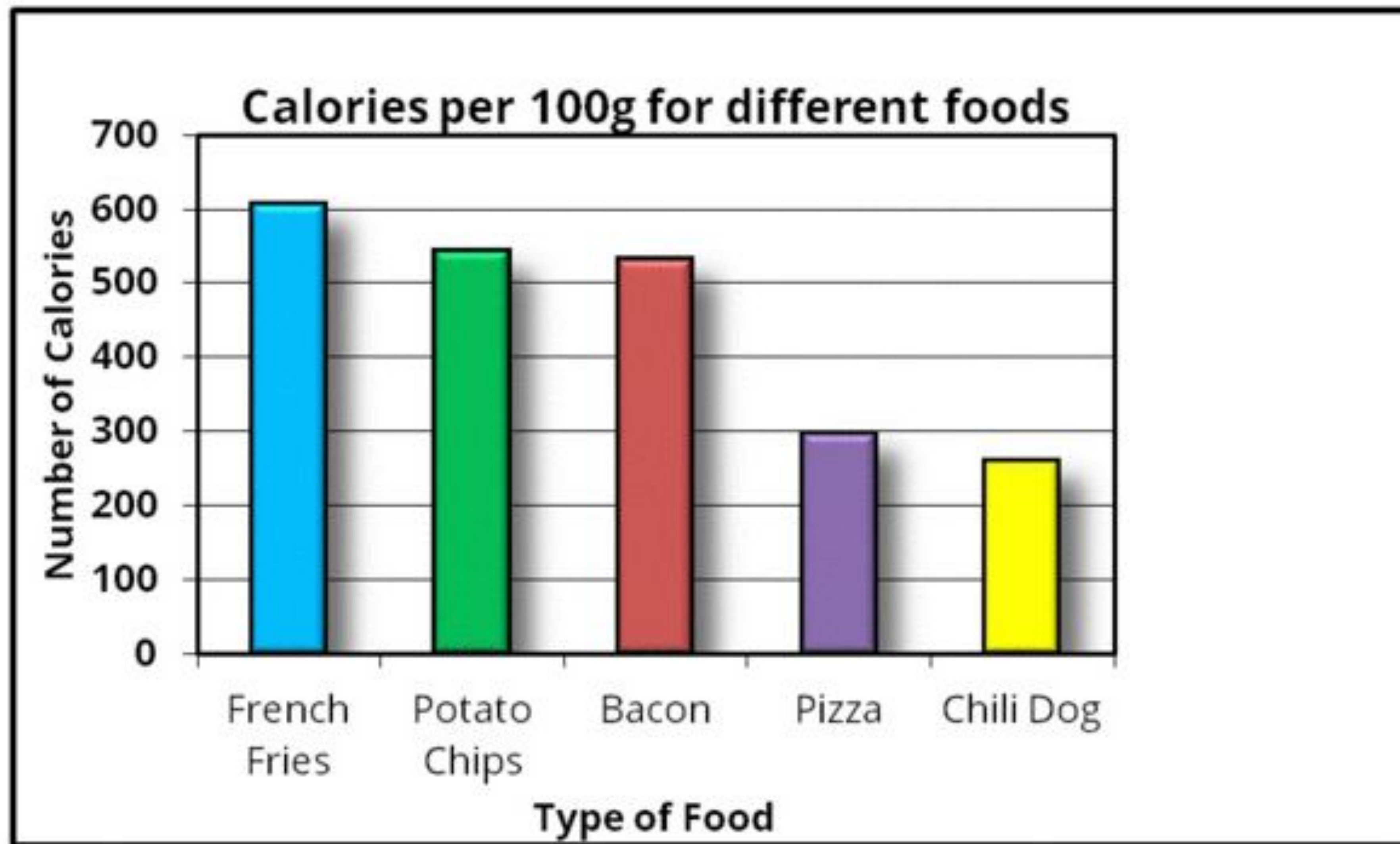
Remove backgrounds



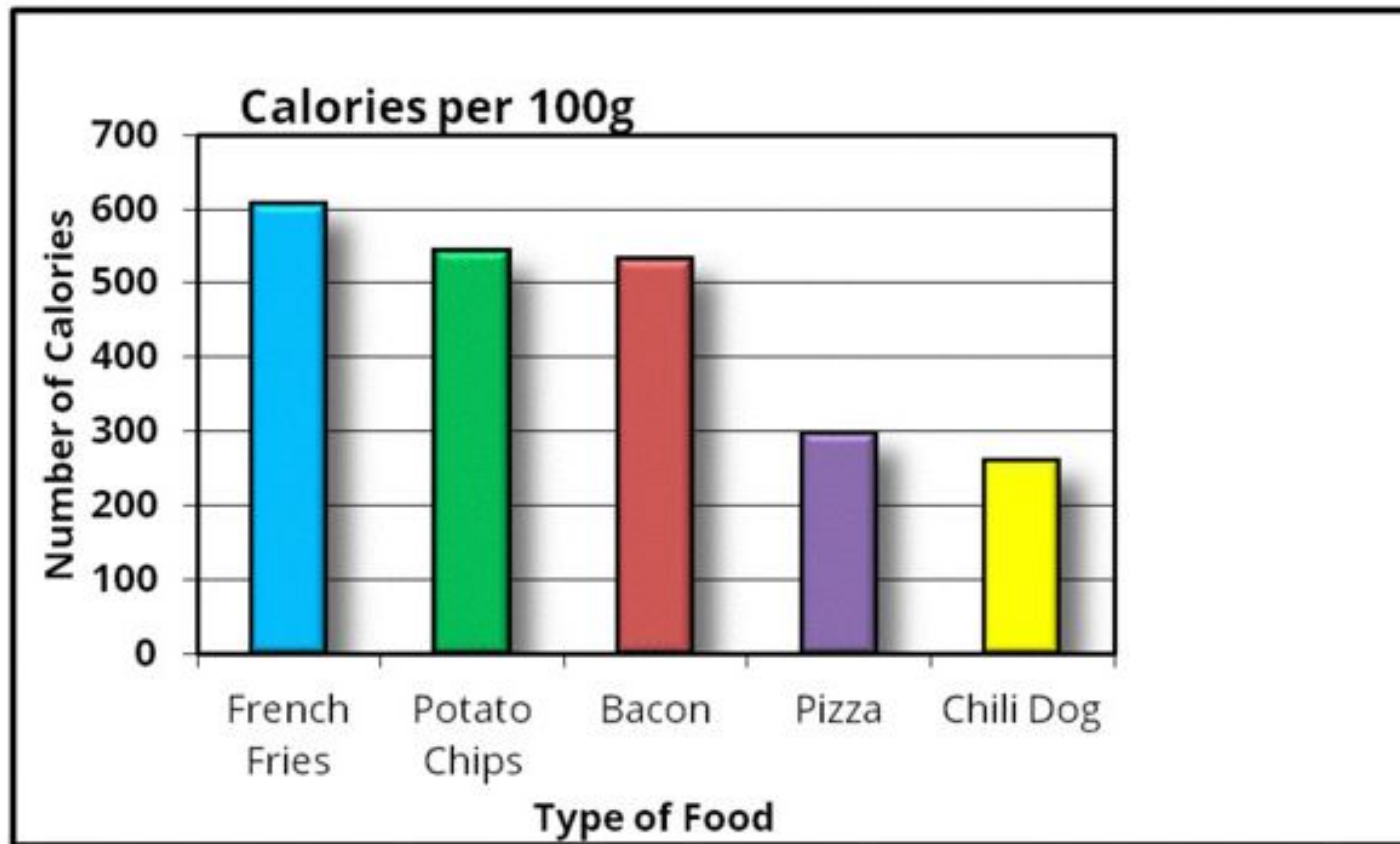
Remove redundant labels



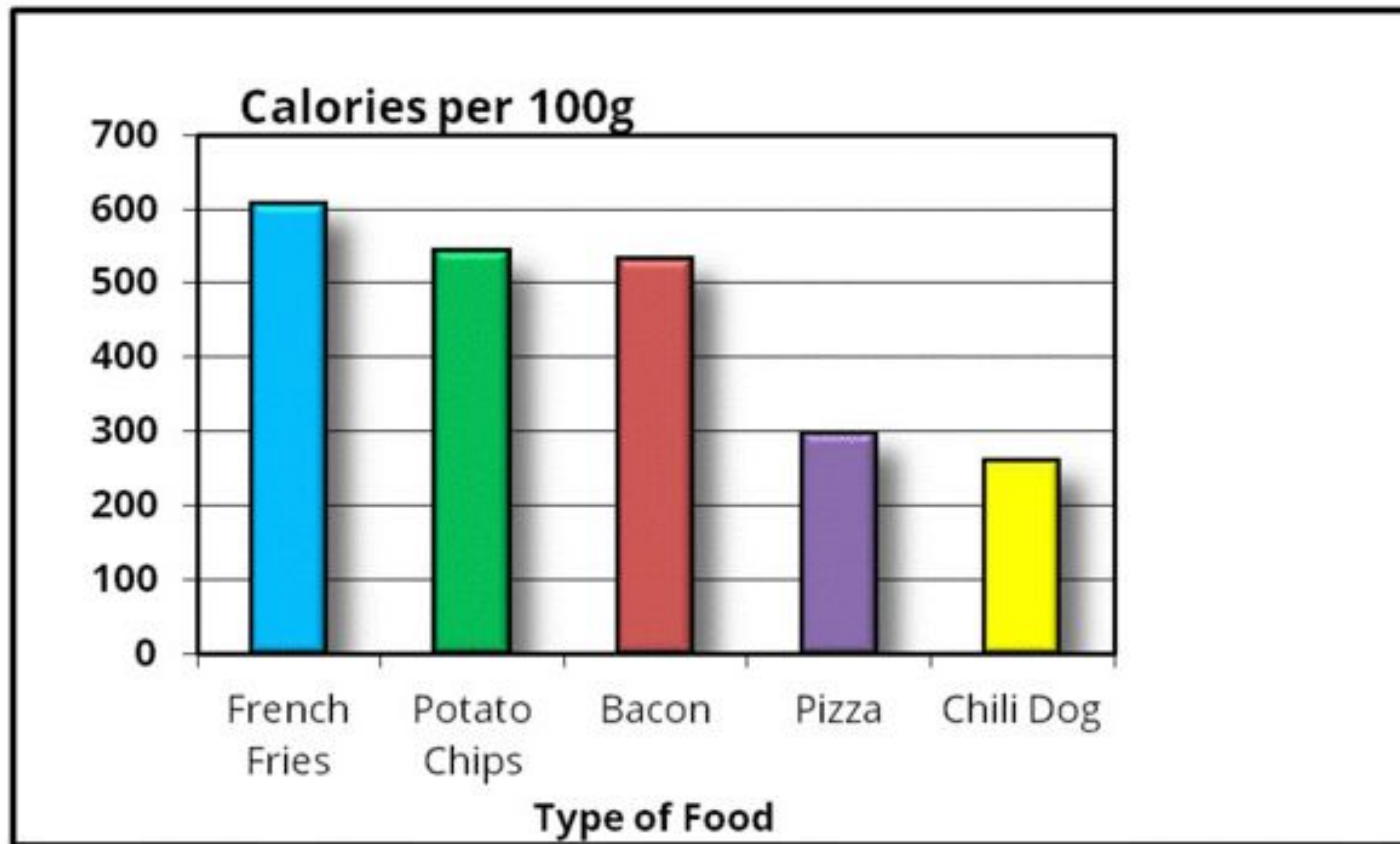
Remove redundant labels



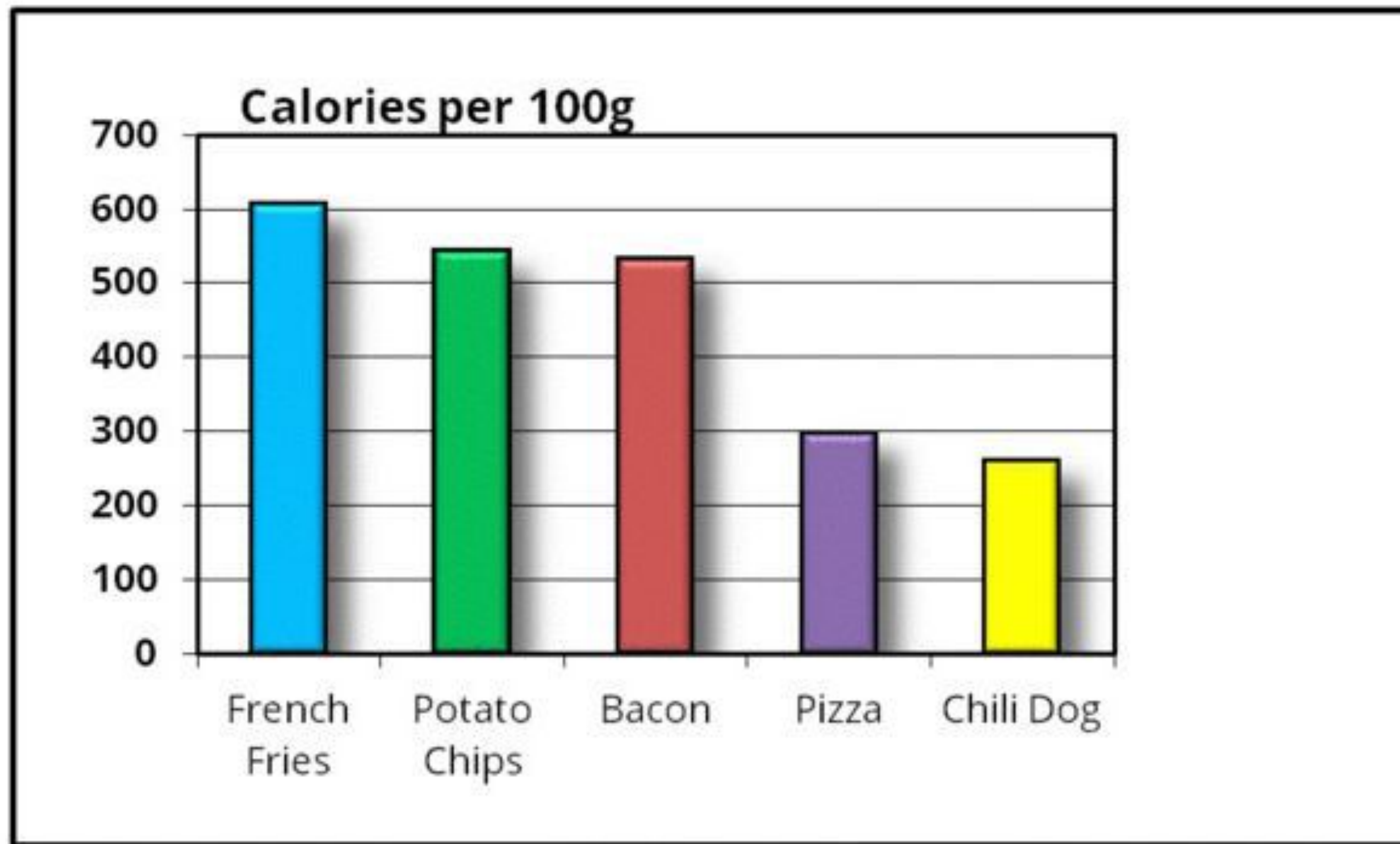
Remove redundant labels



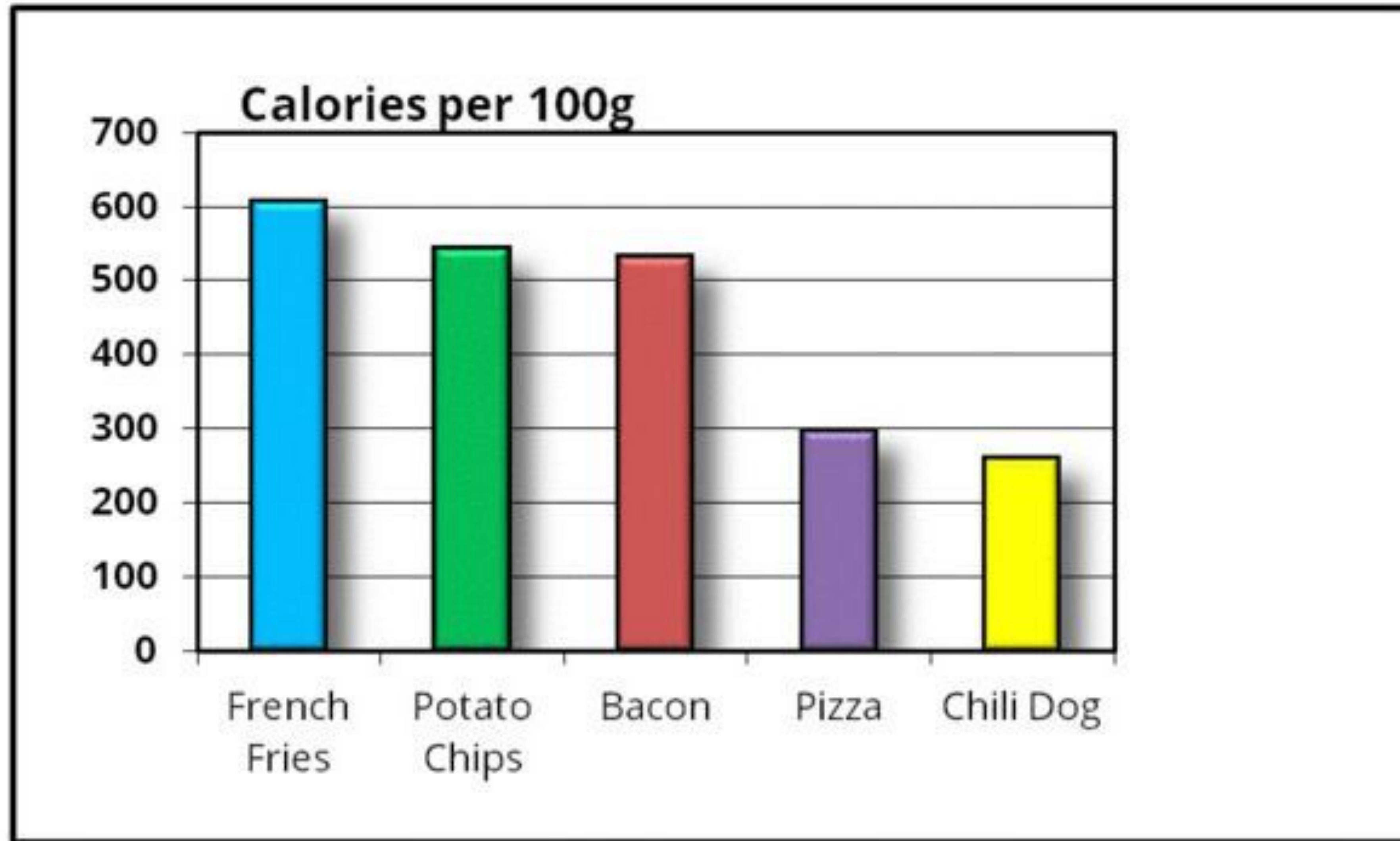
Remove redundant labels



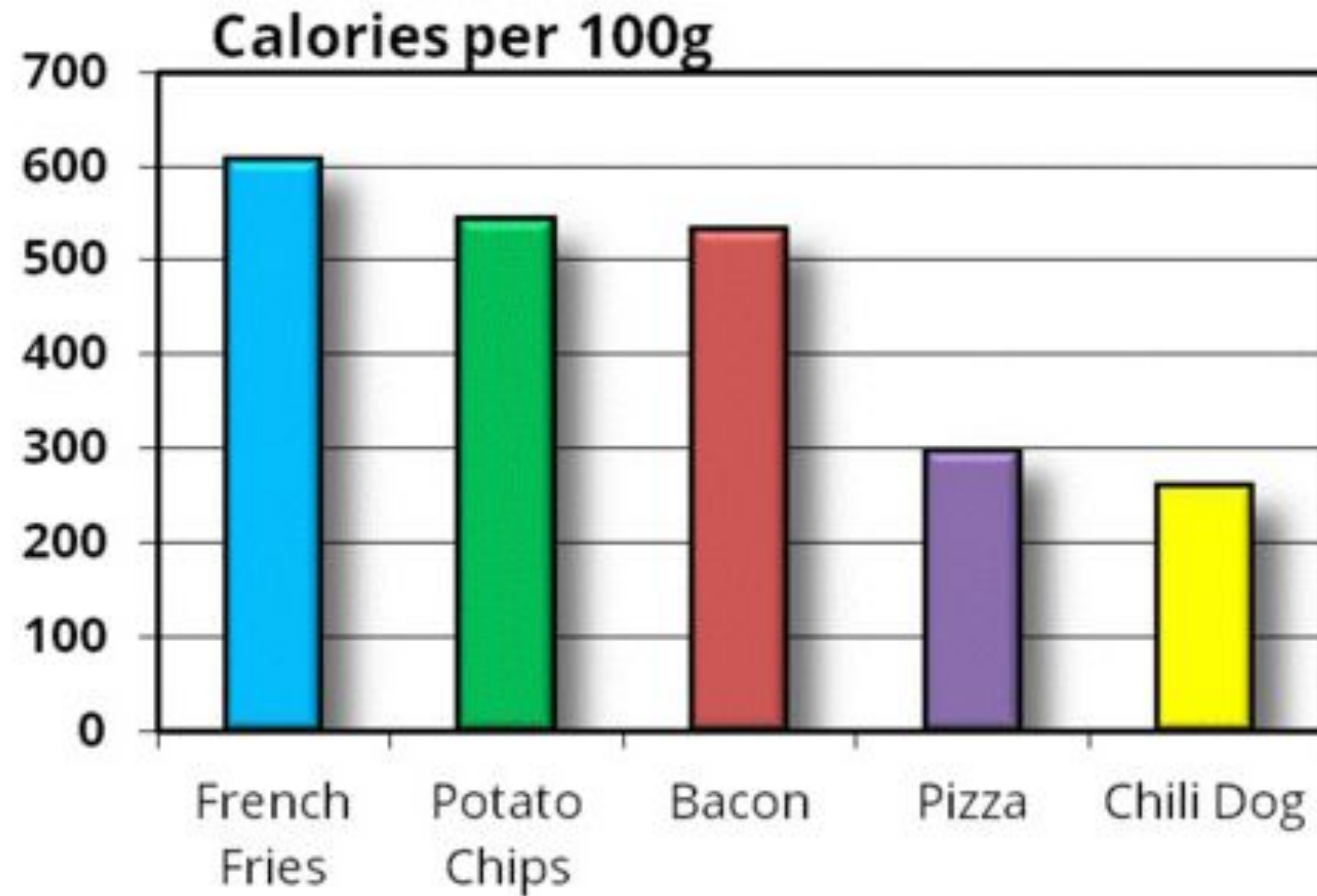
Remove redundant labels



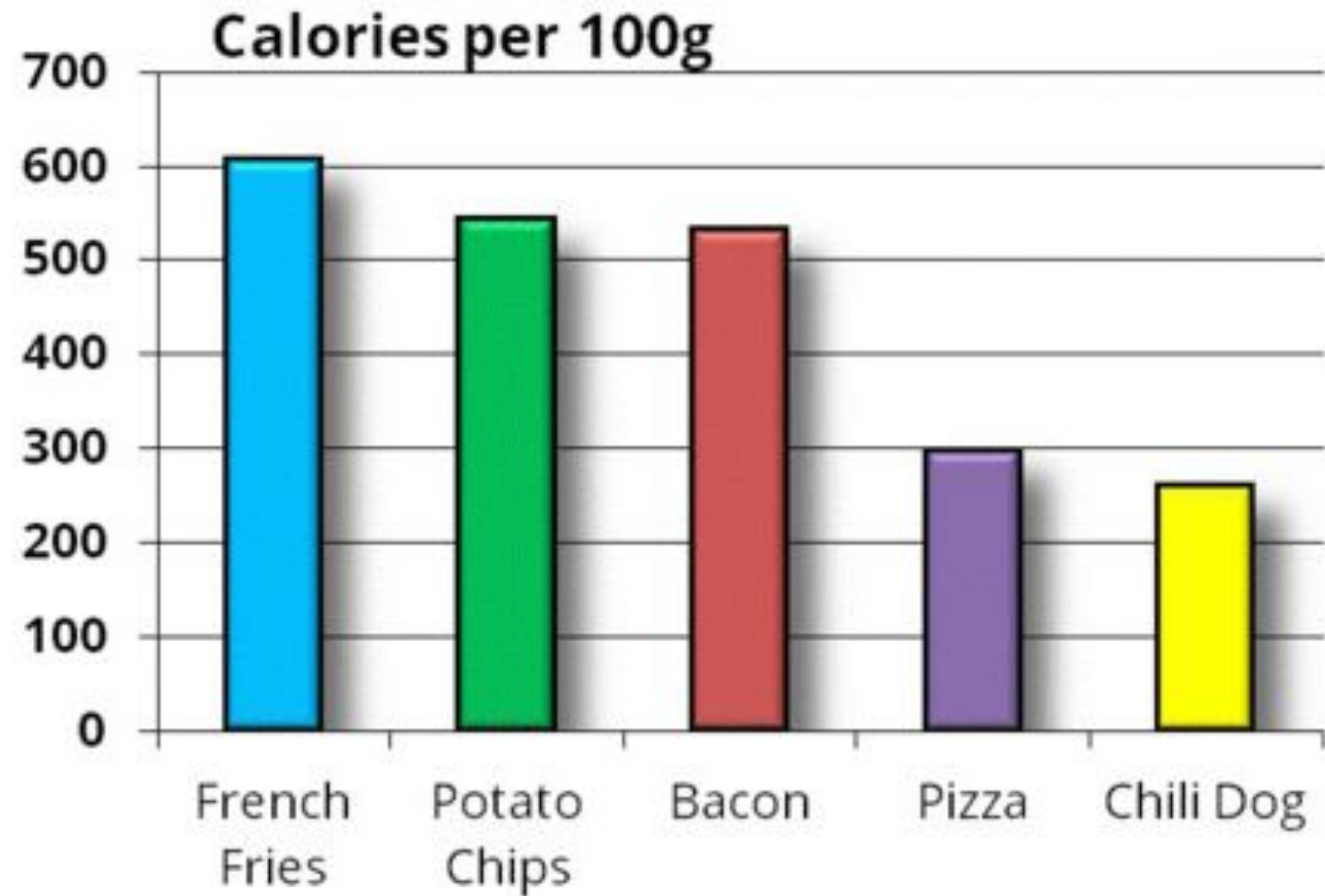
Remove borders



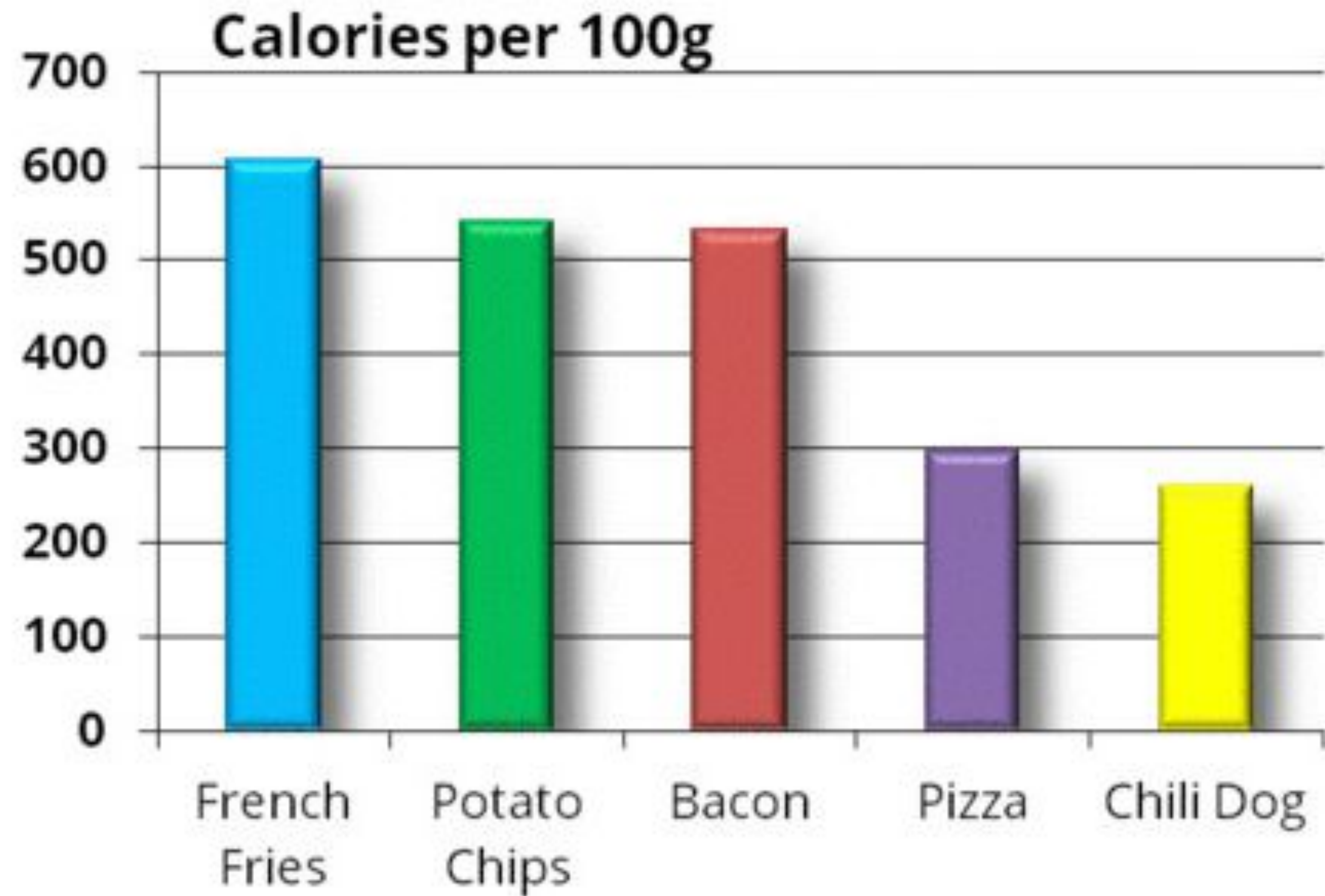
Remove borders



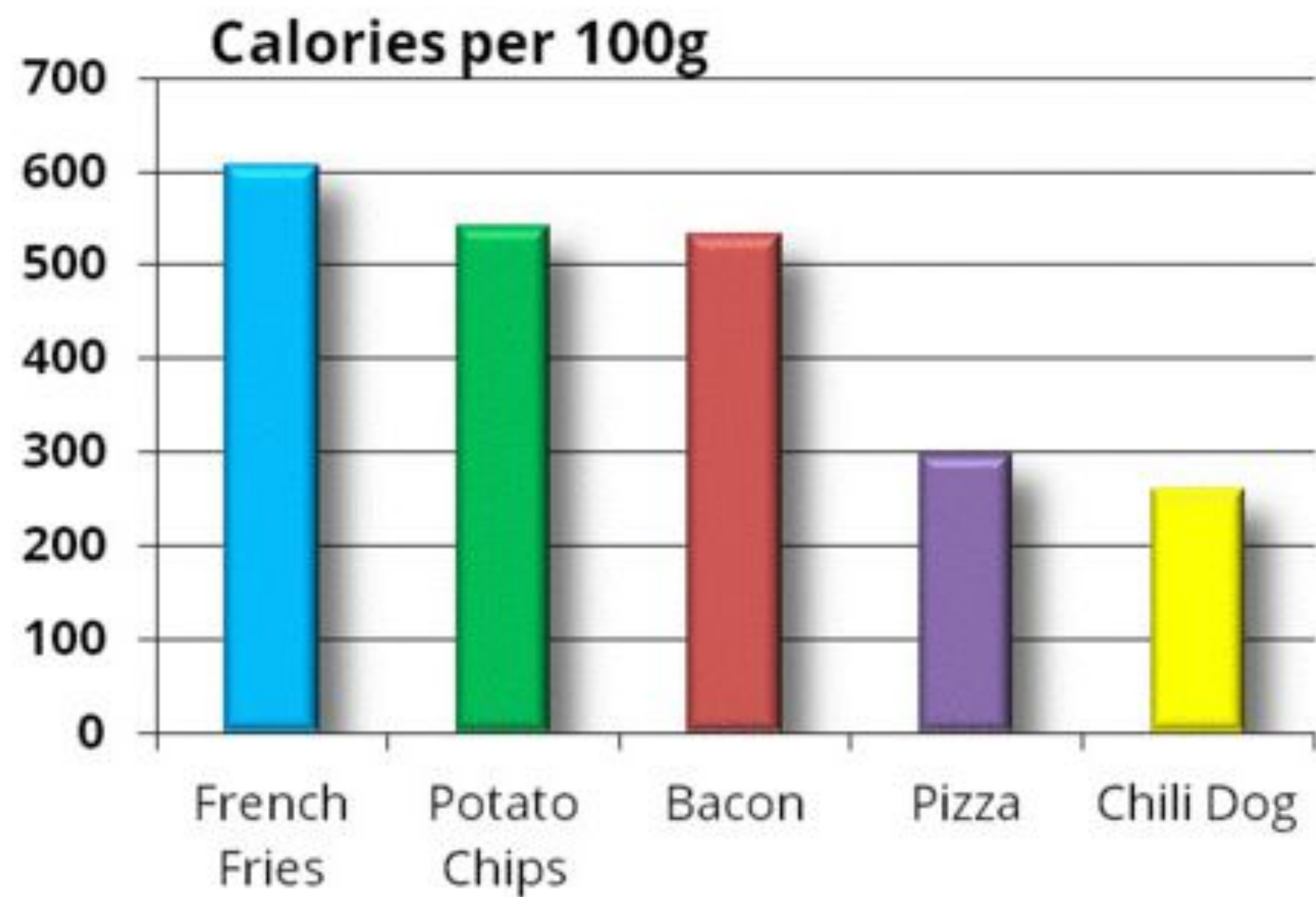
Remove borders



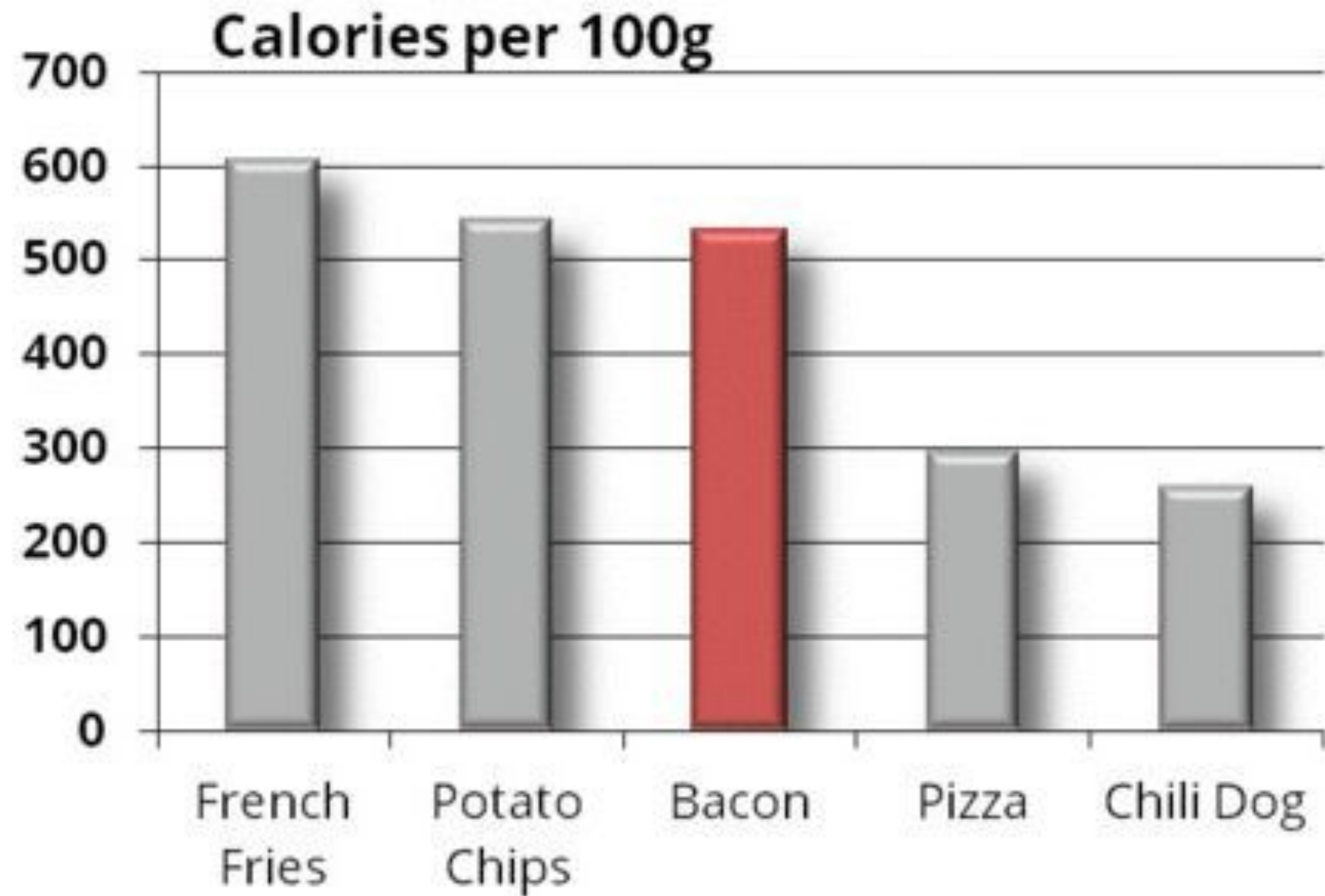
Remove borders



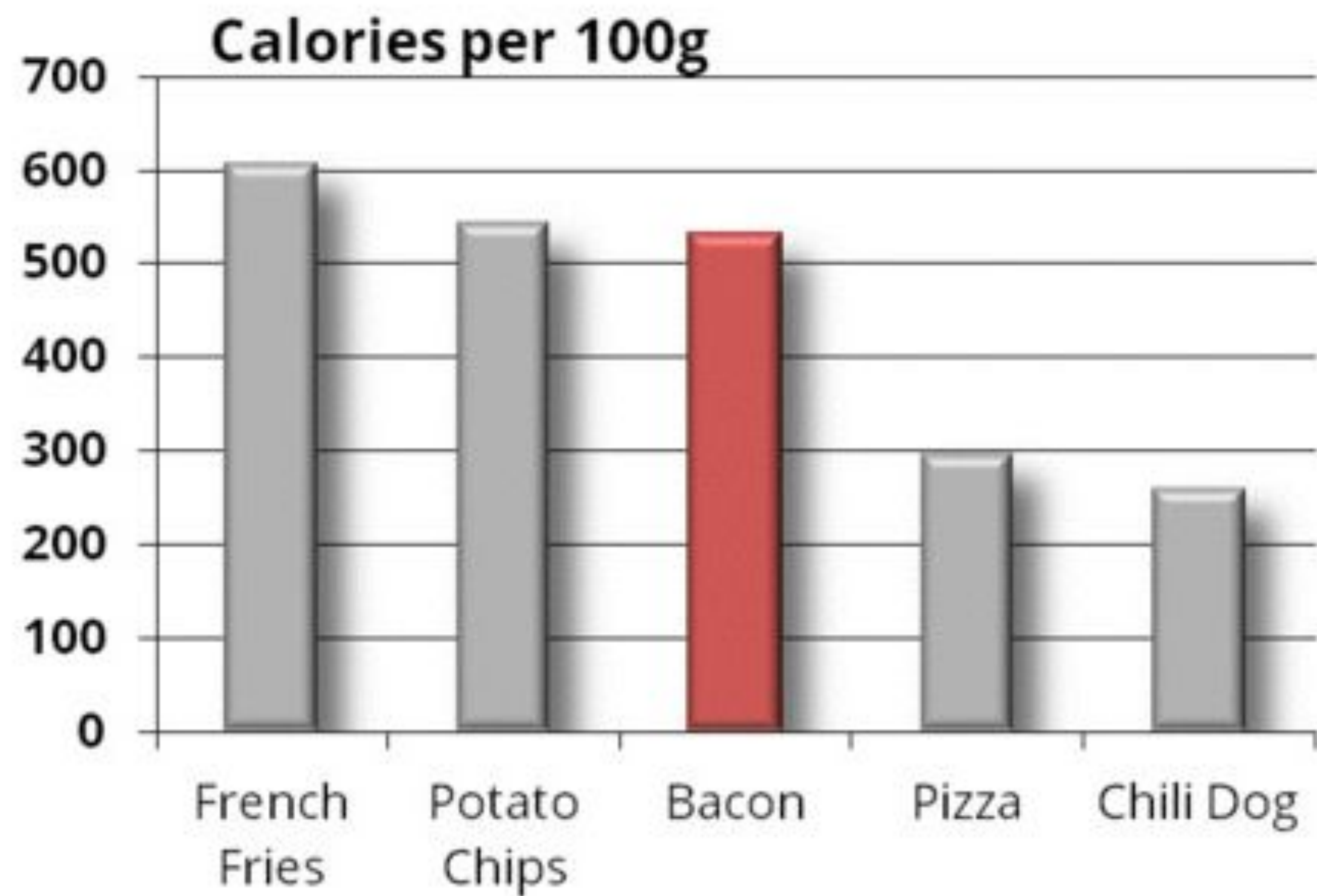
Reduce colors



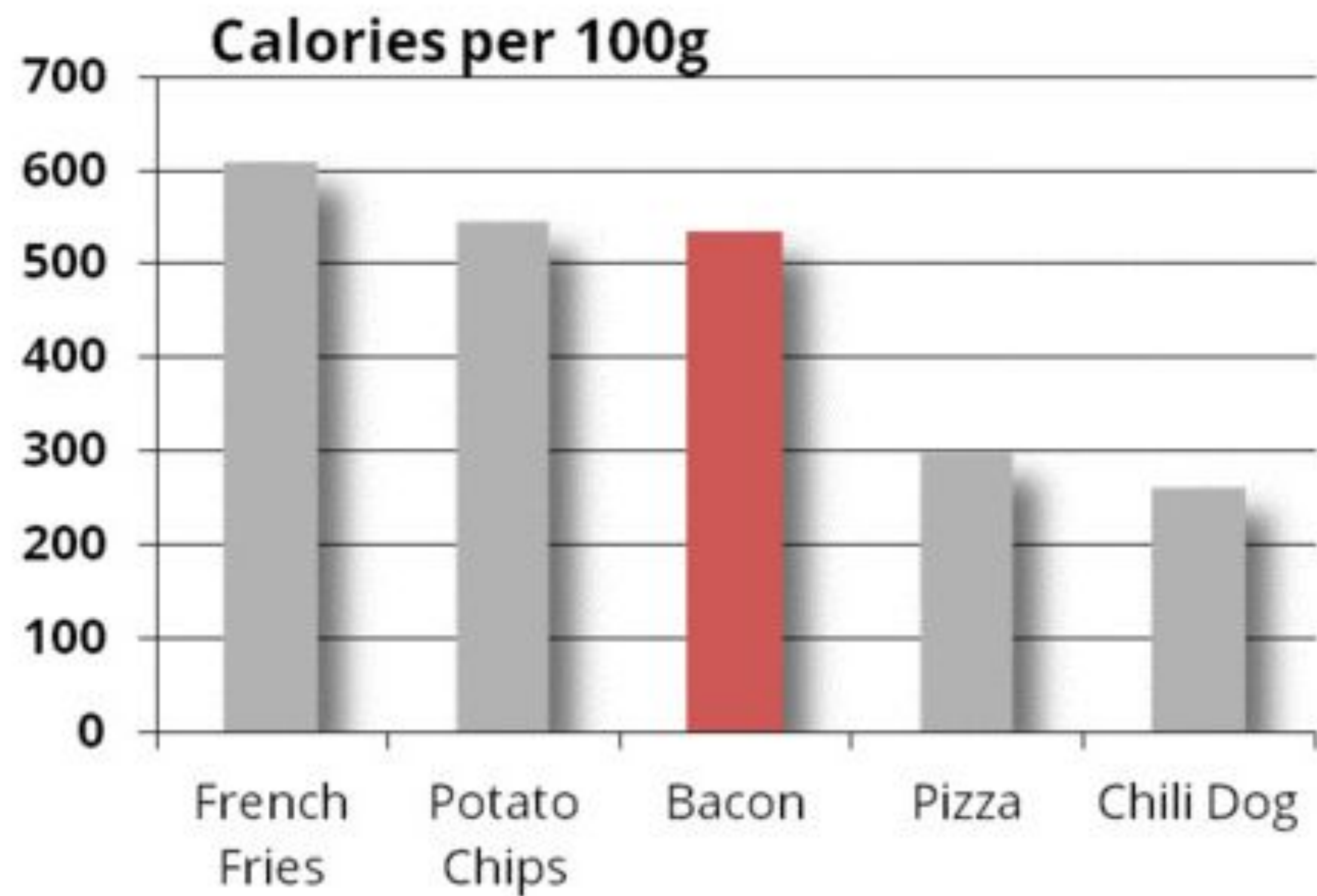
Reduce colors



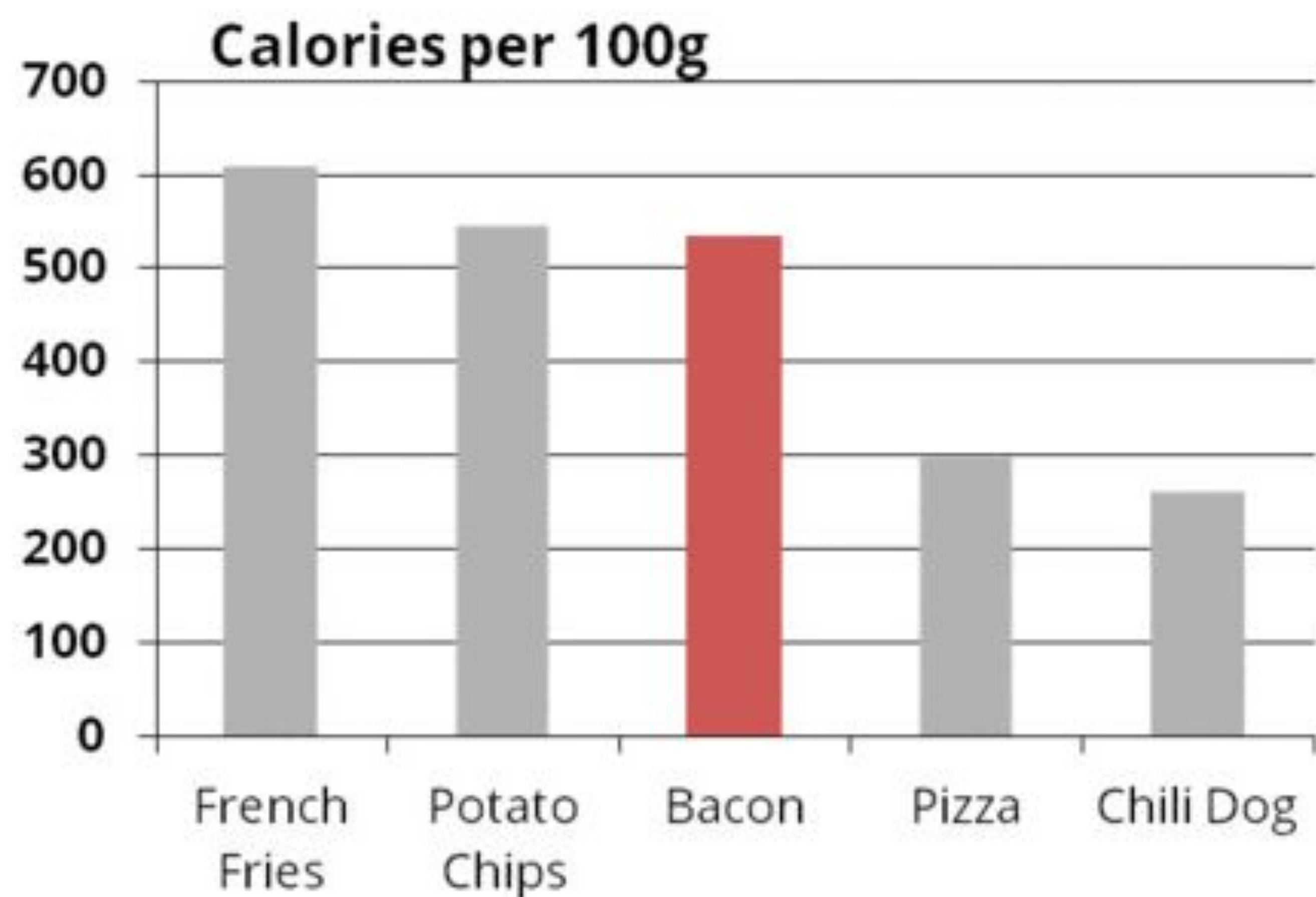
Remove special effects



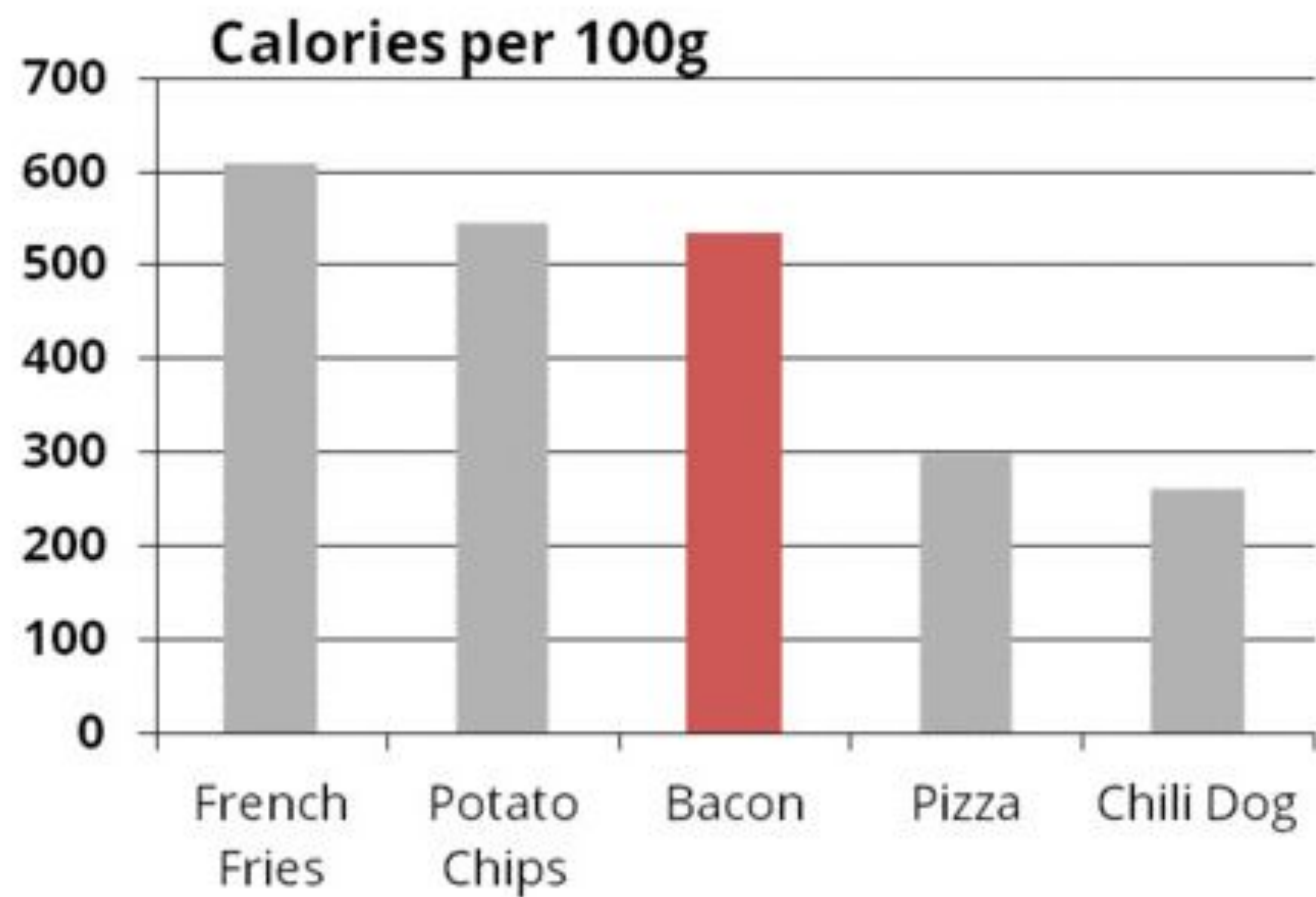
Remove special effects



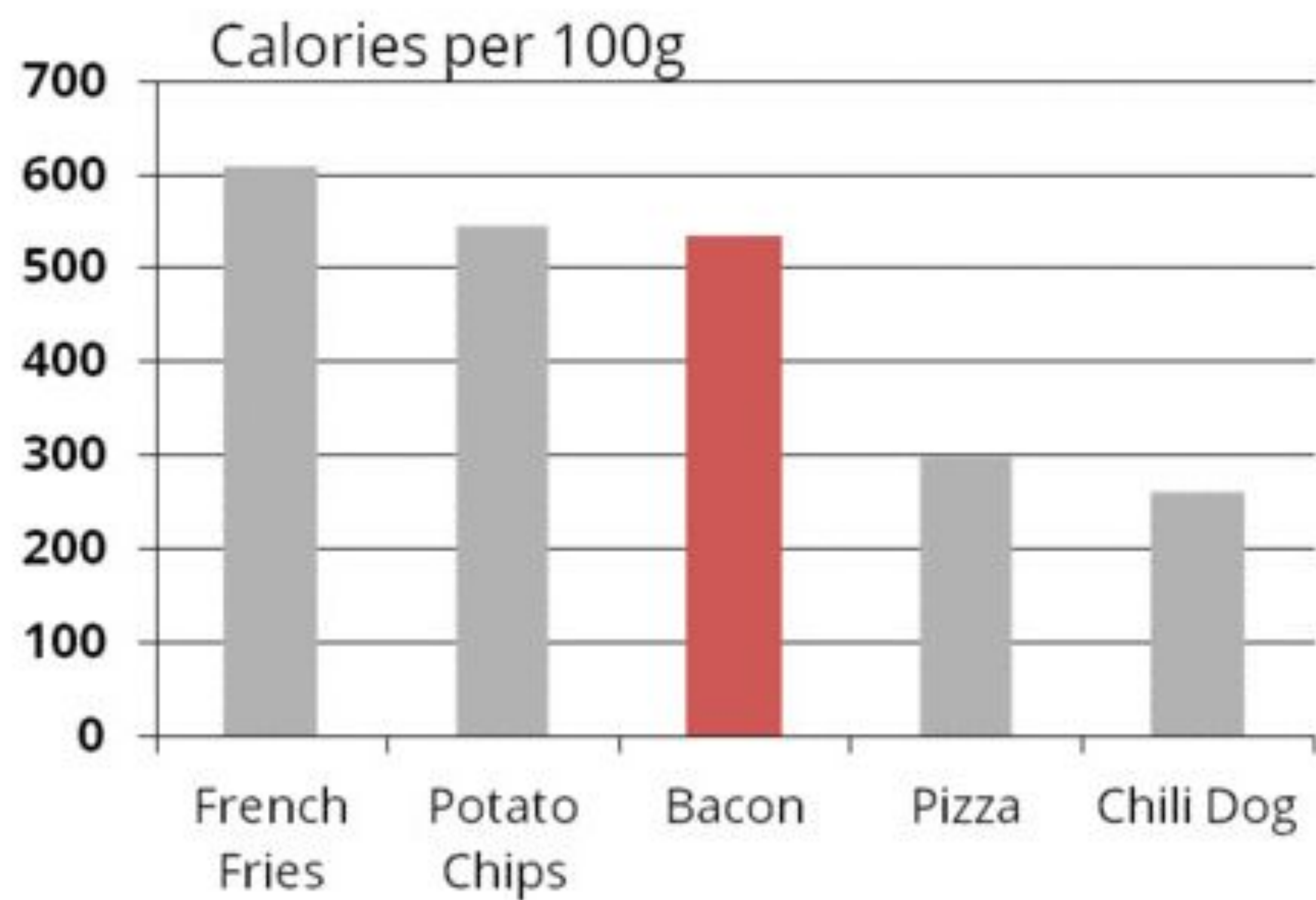
Remove special effects



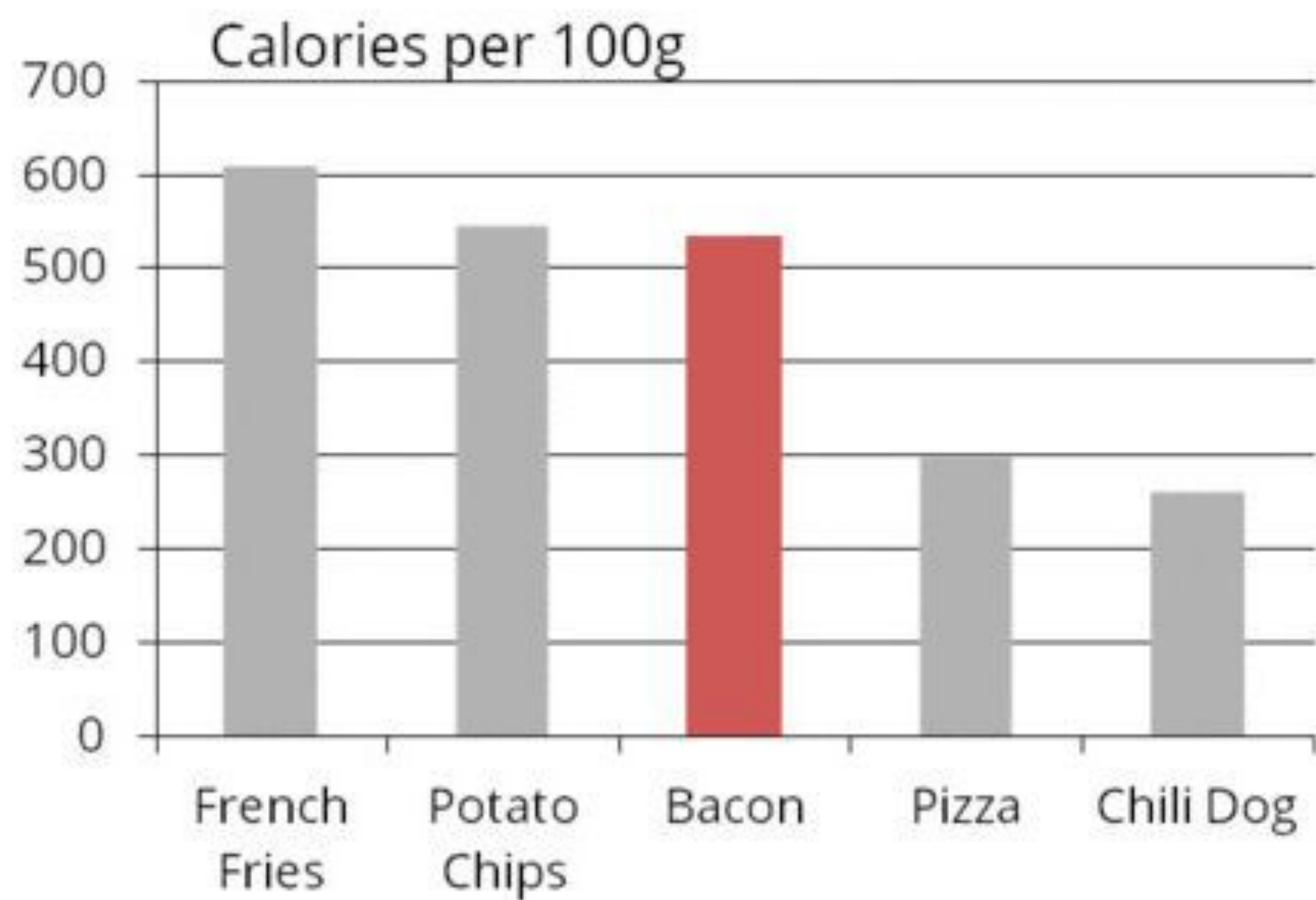
Remove bolding



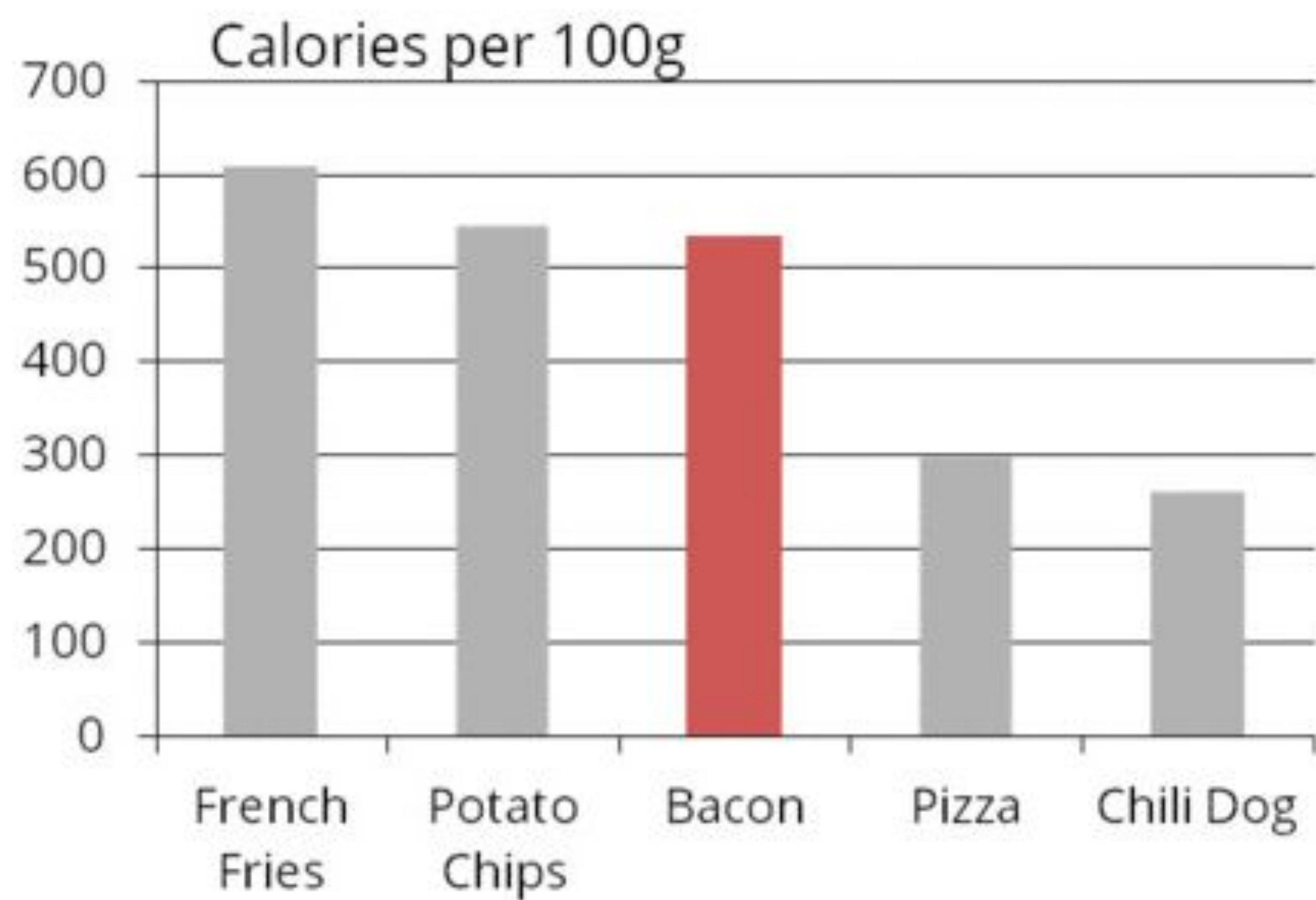
Remove bolding



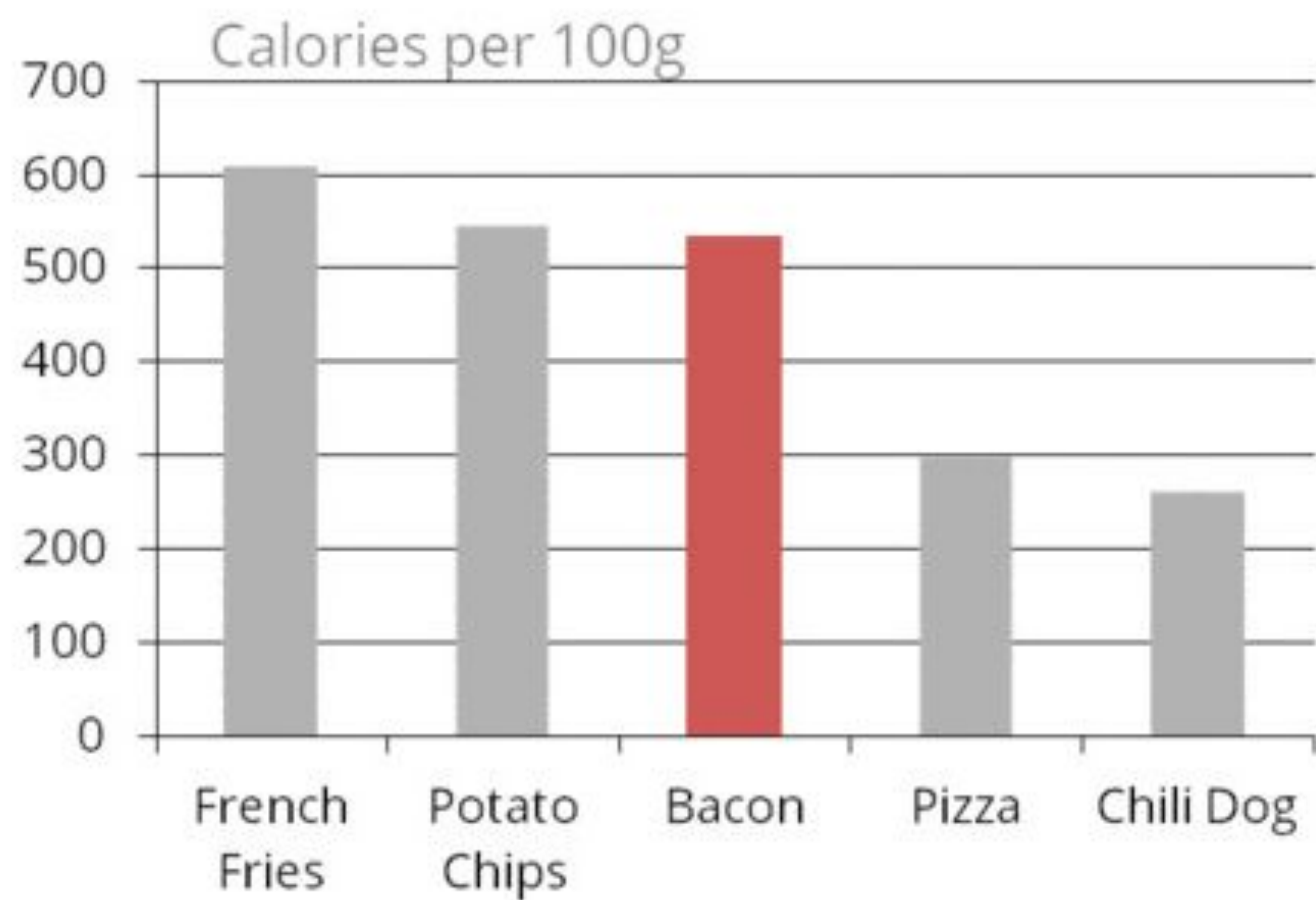
Remove bolding



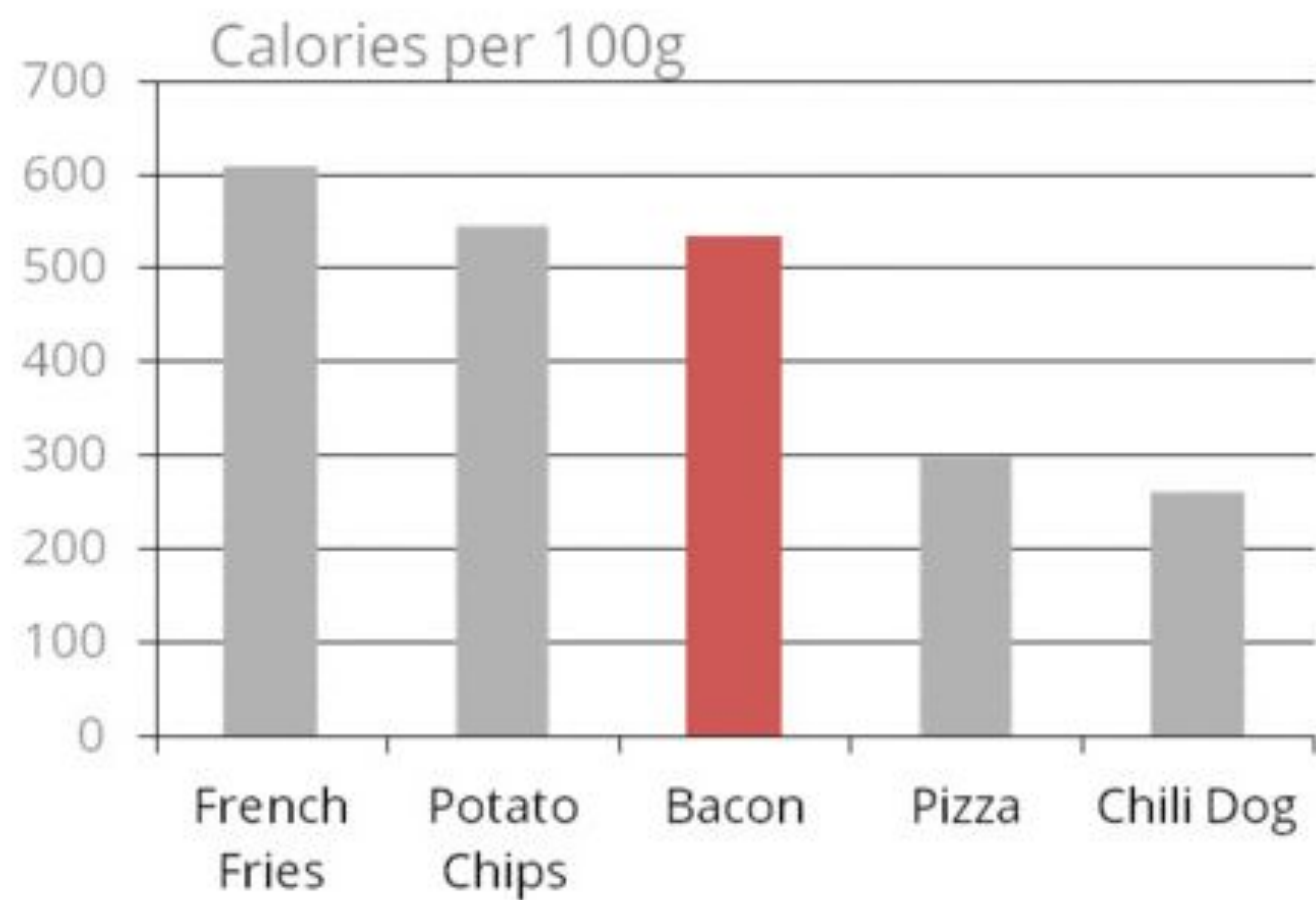
Lighten labels



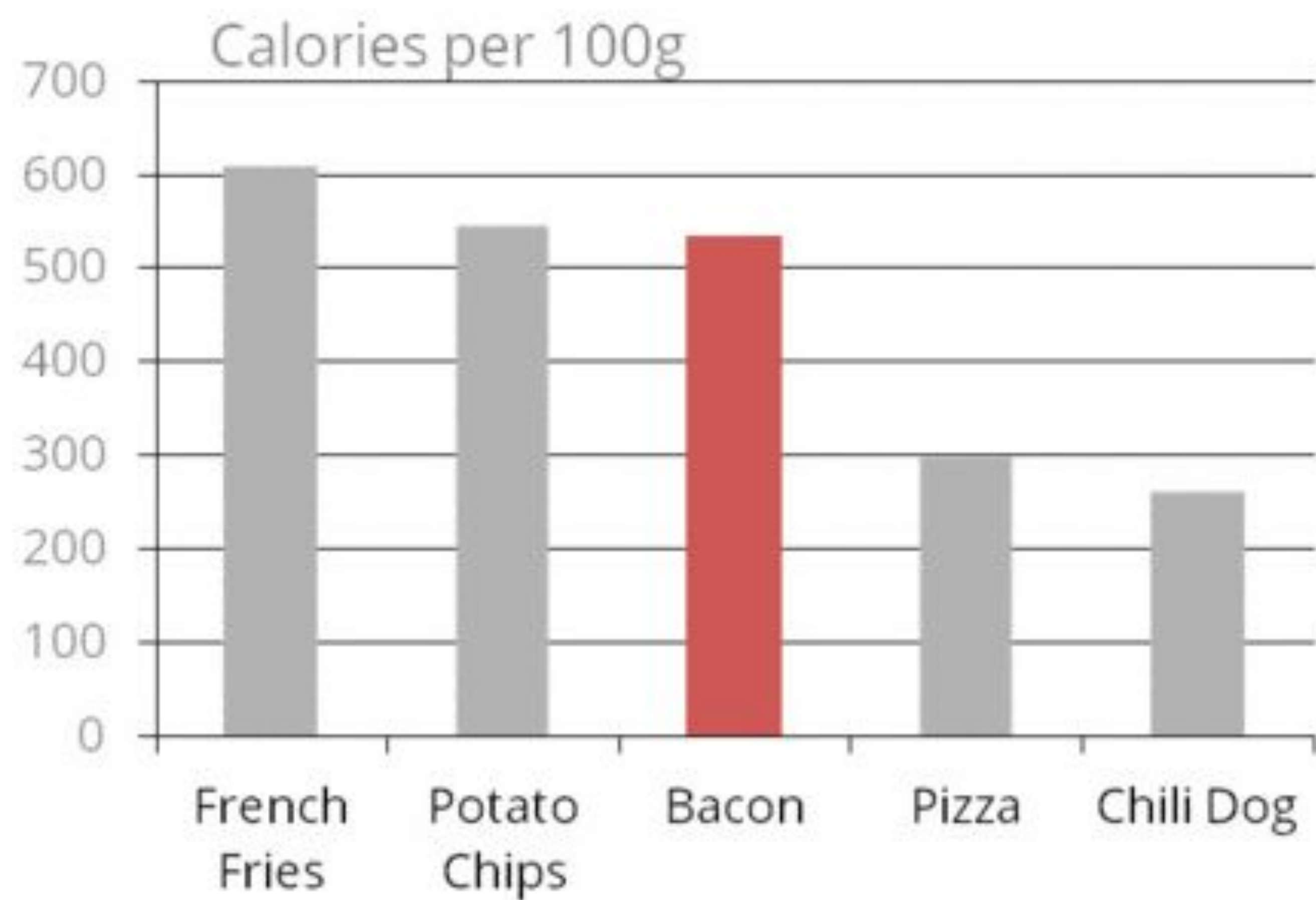
Lighten labels



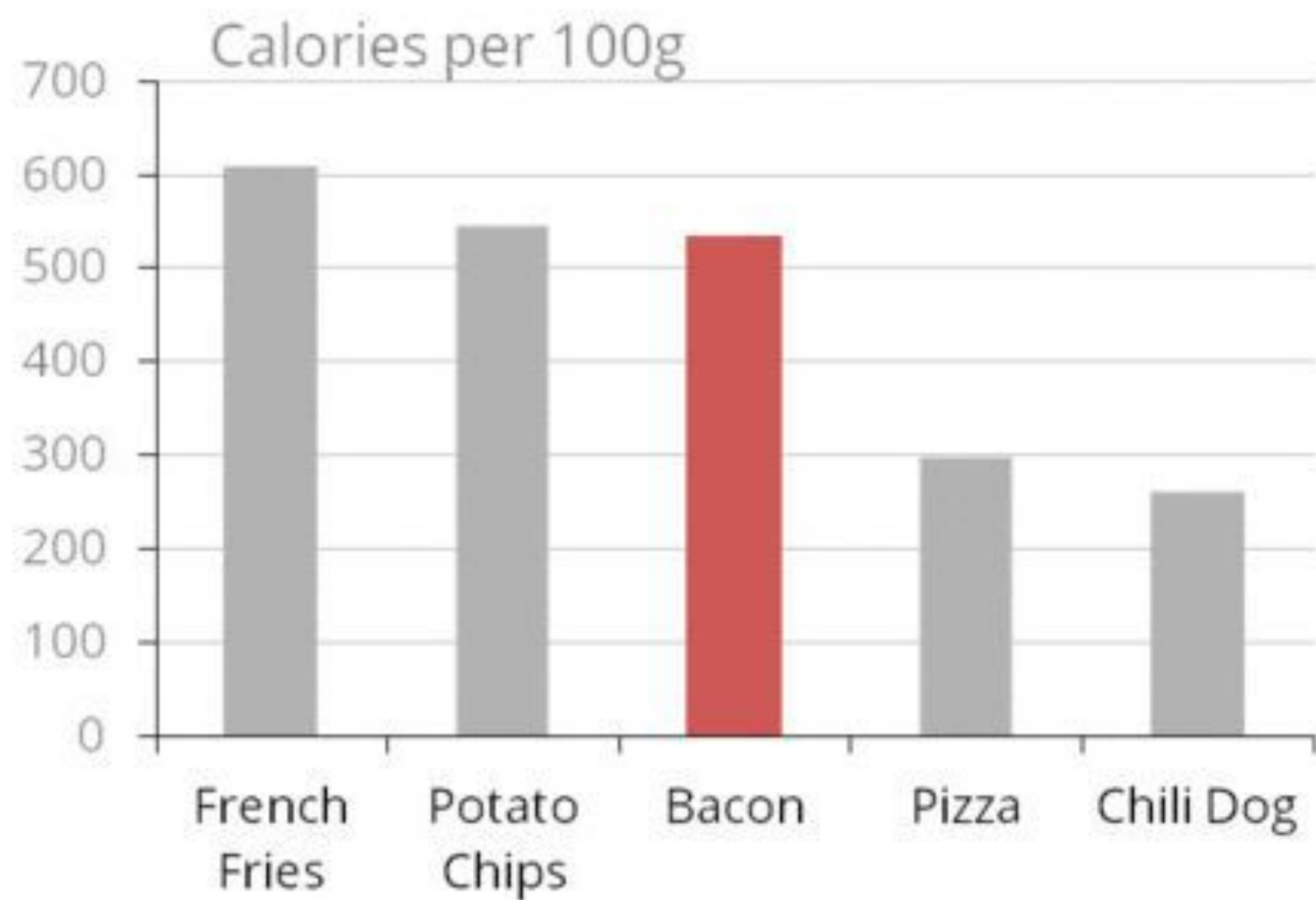
Lighten labels



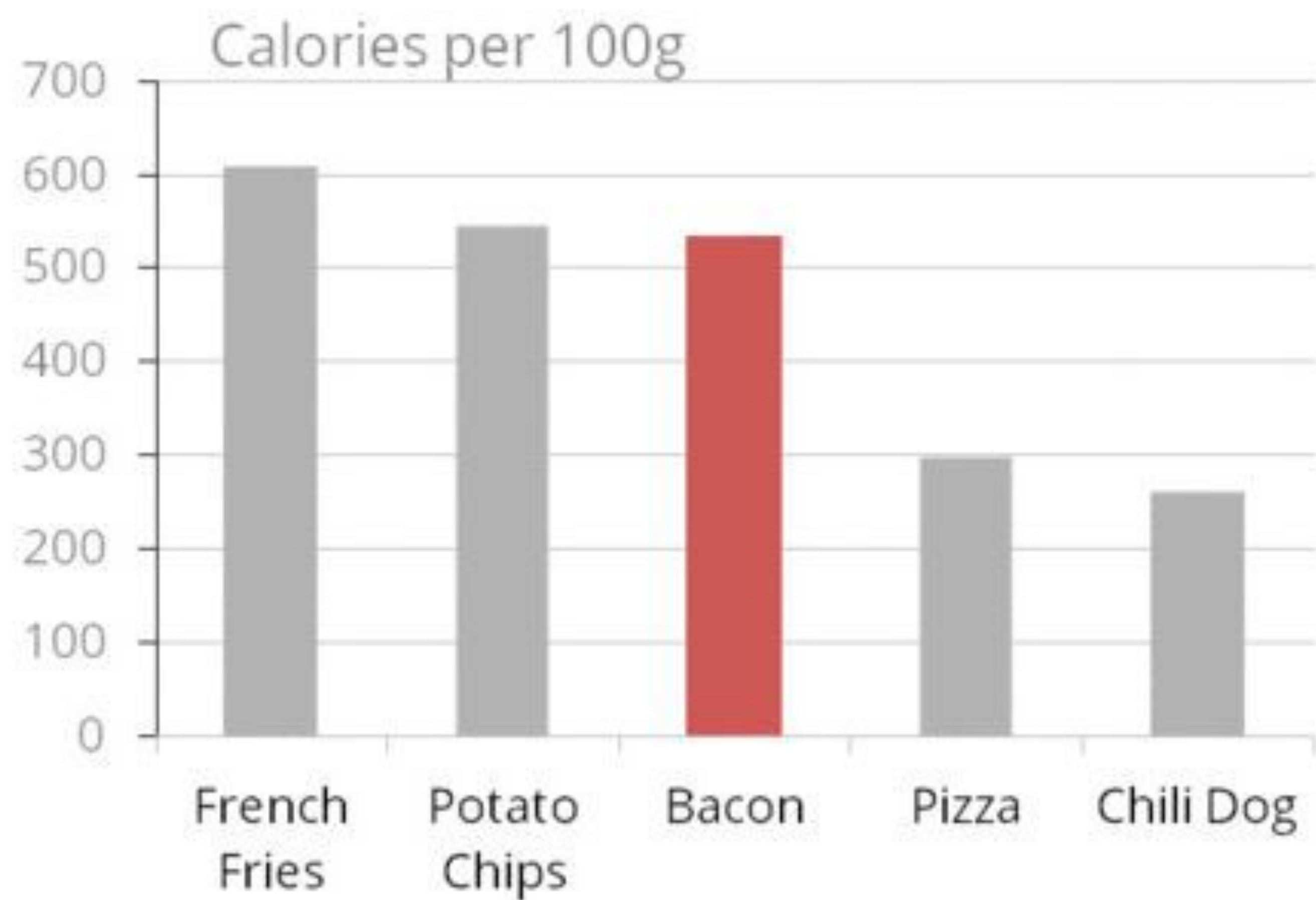
Lighten lines



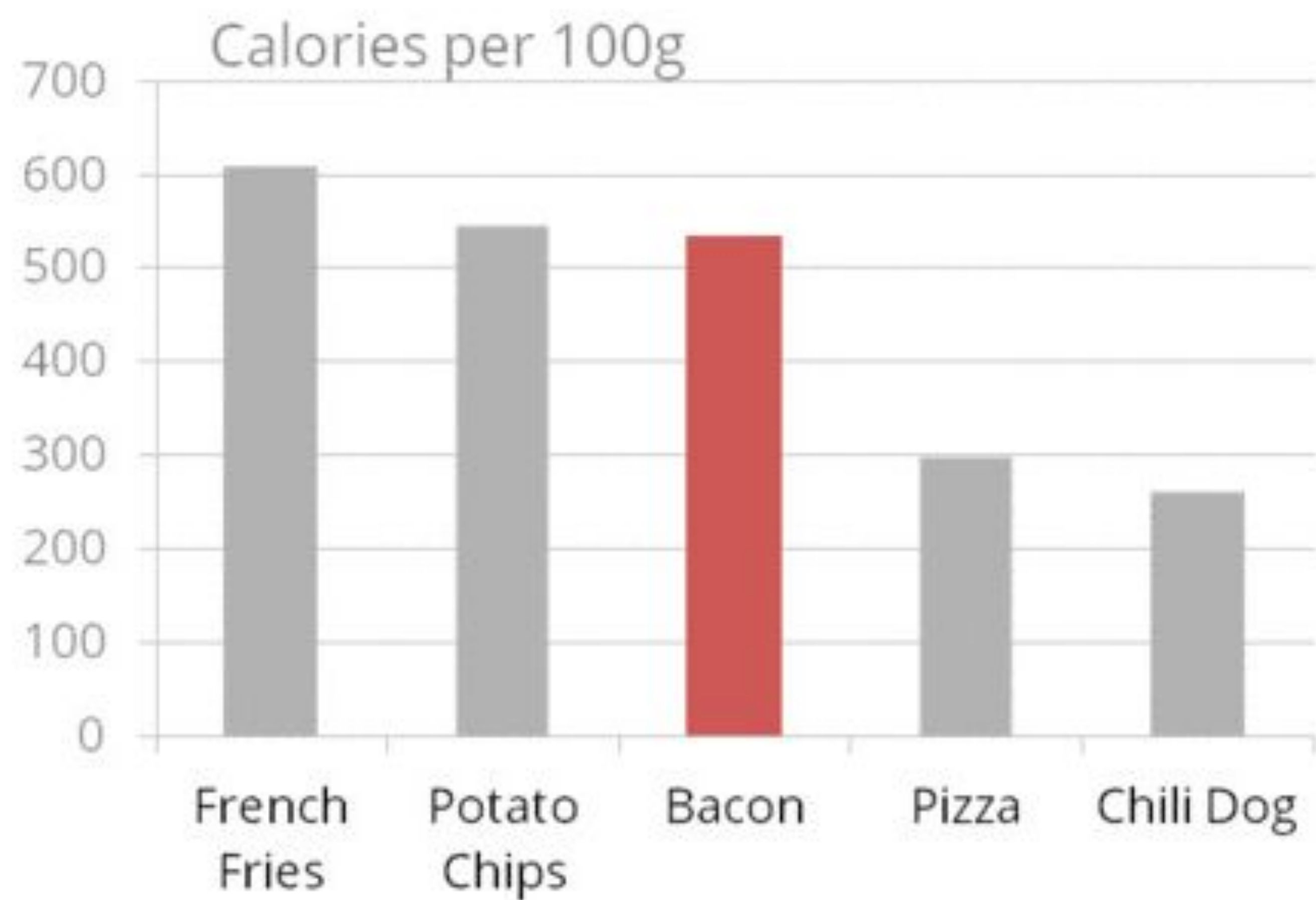
Lighten lines



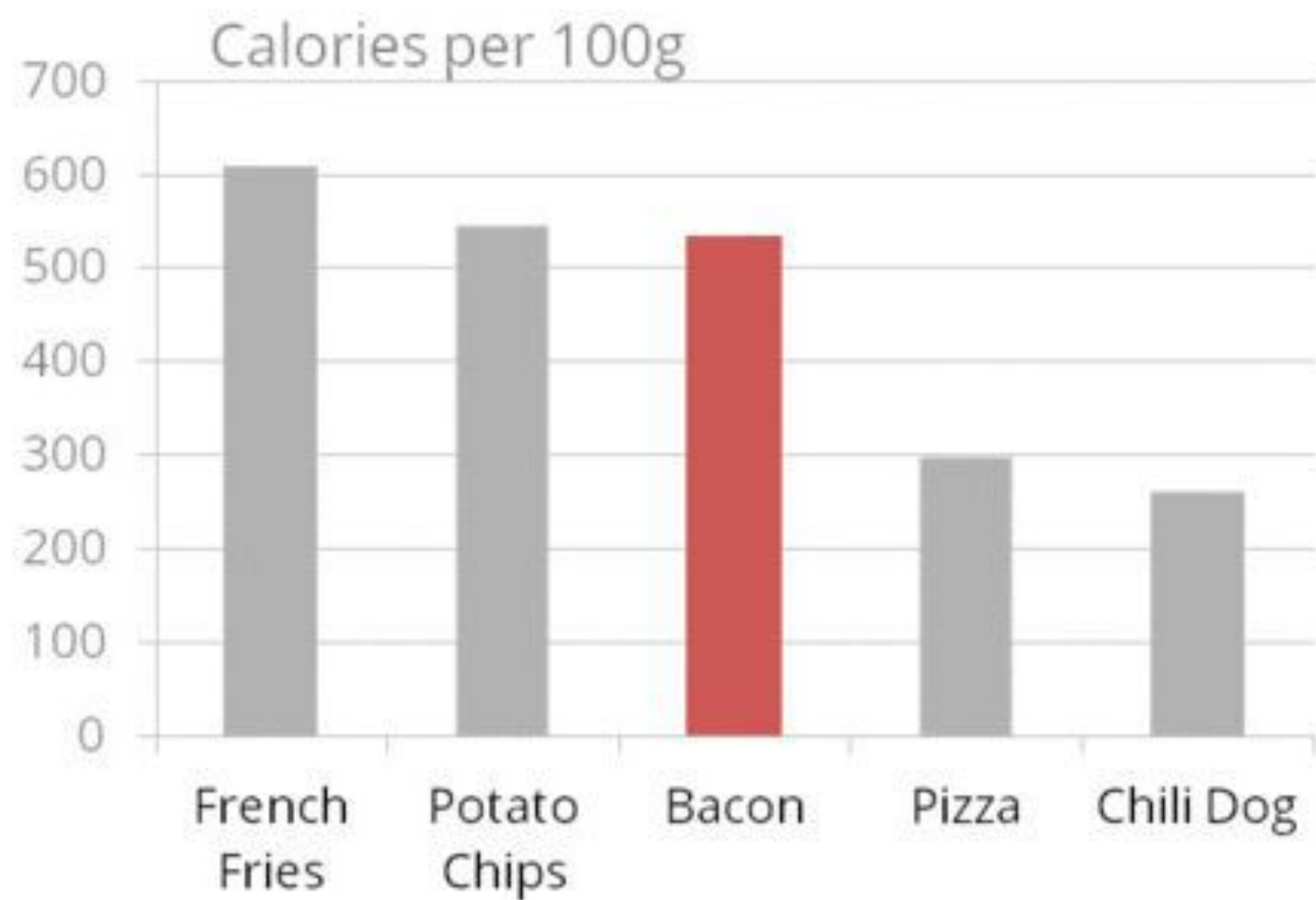
Lighten lines



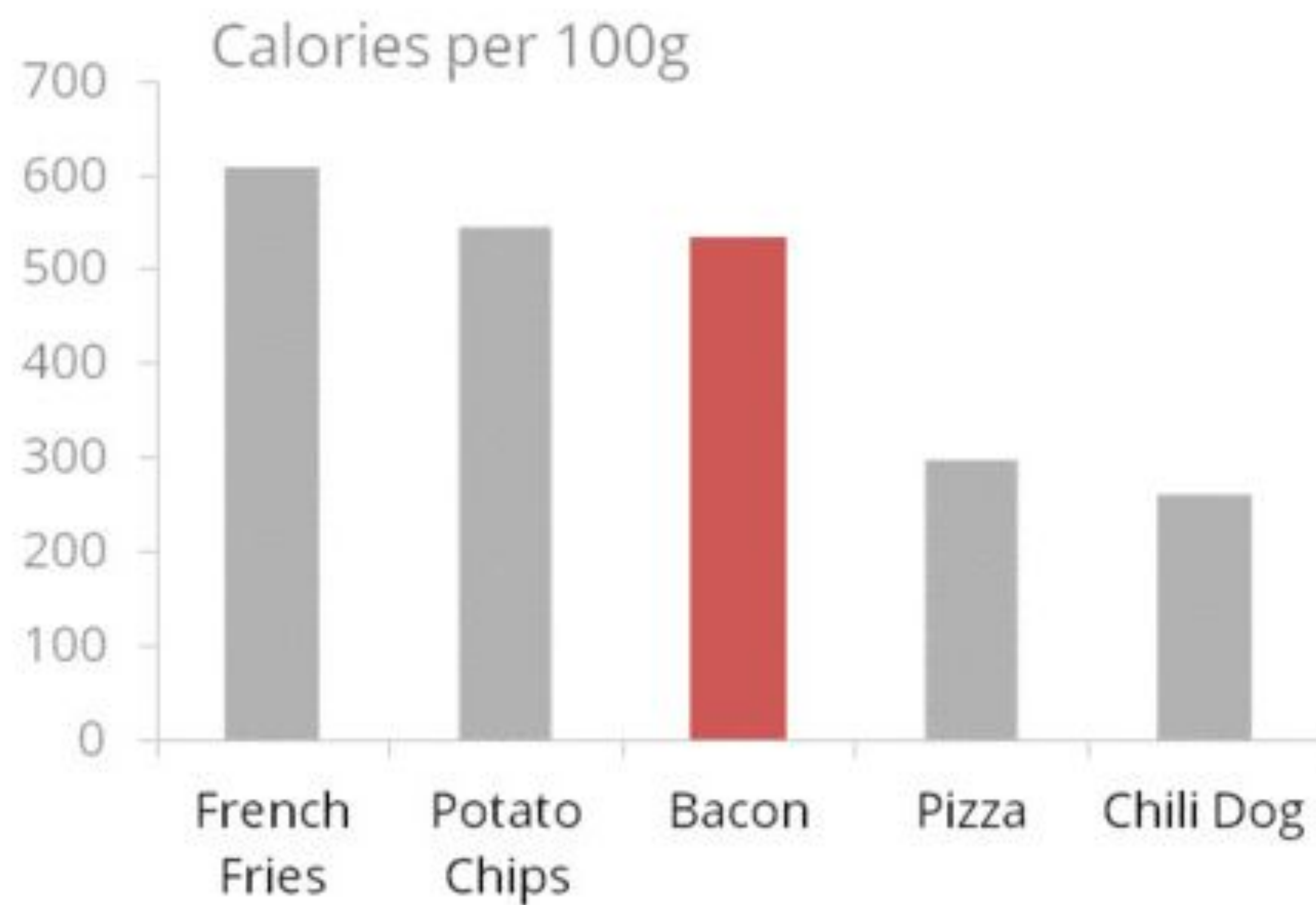
Lighten lines



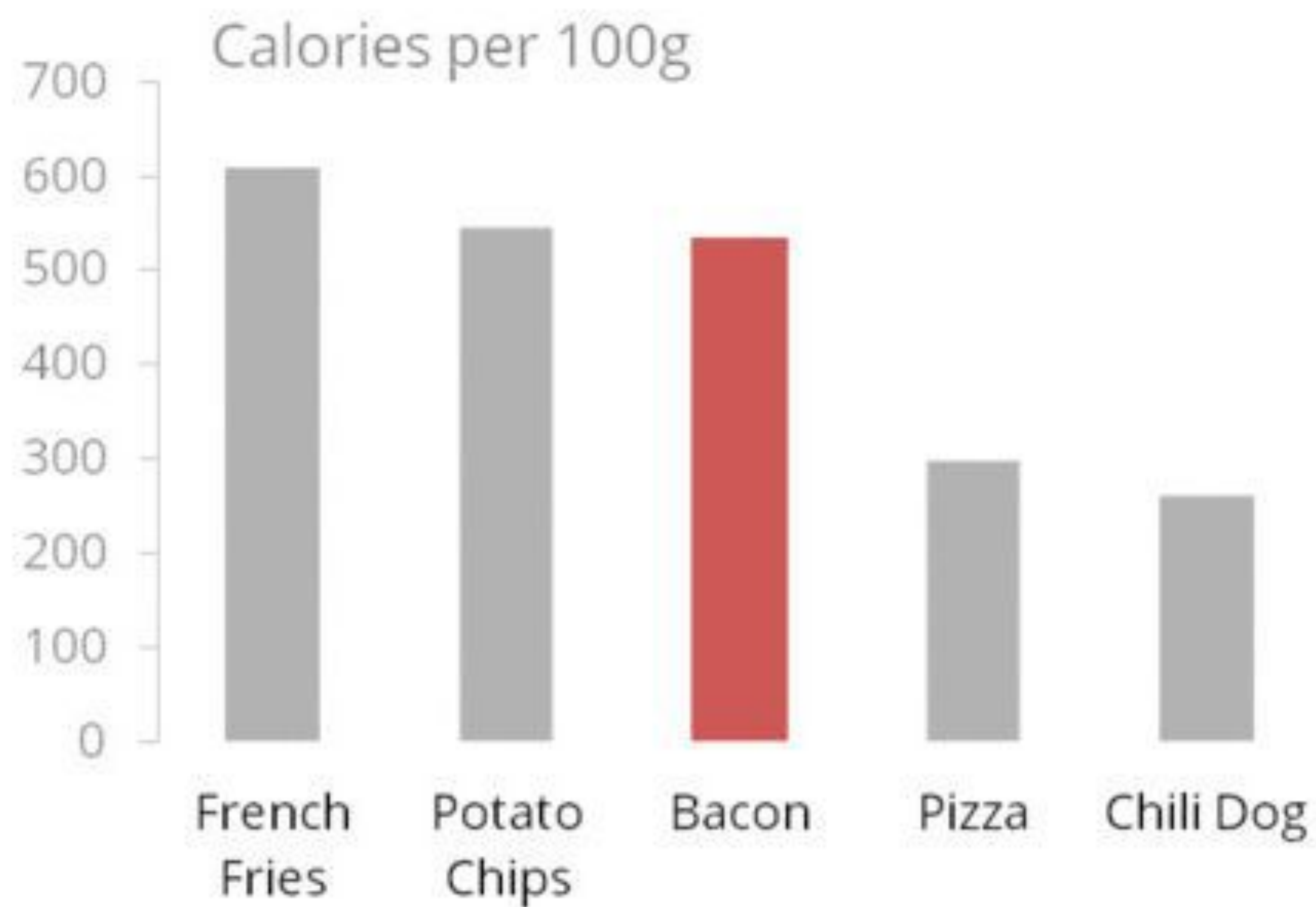
Or remove lines



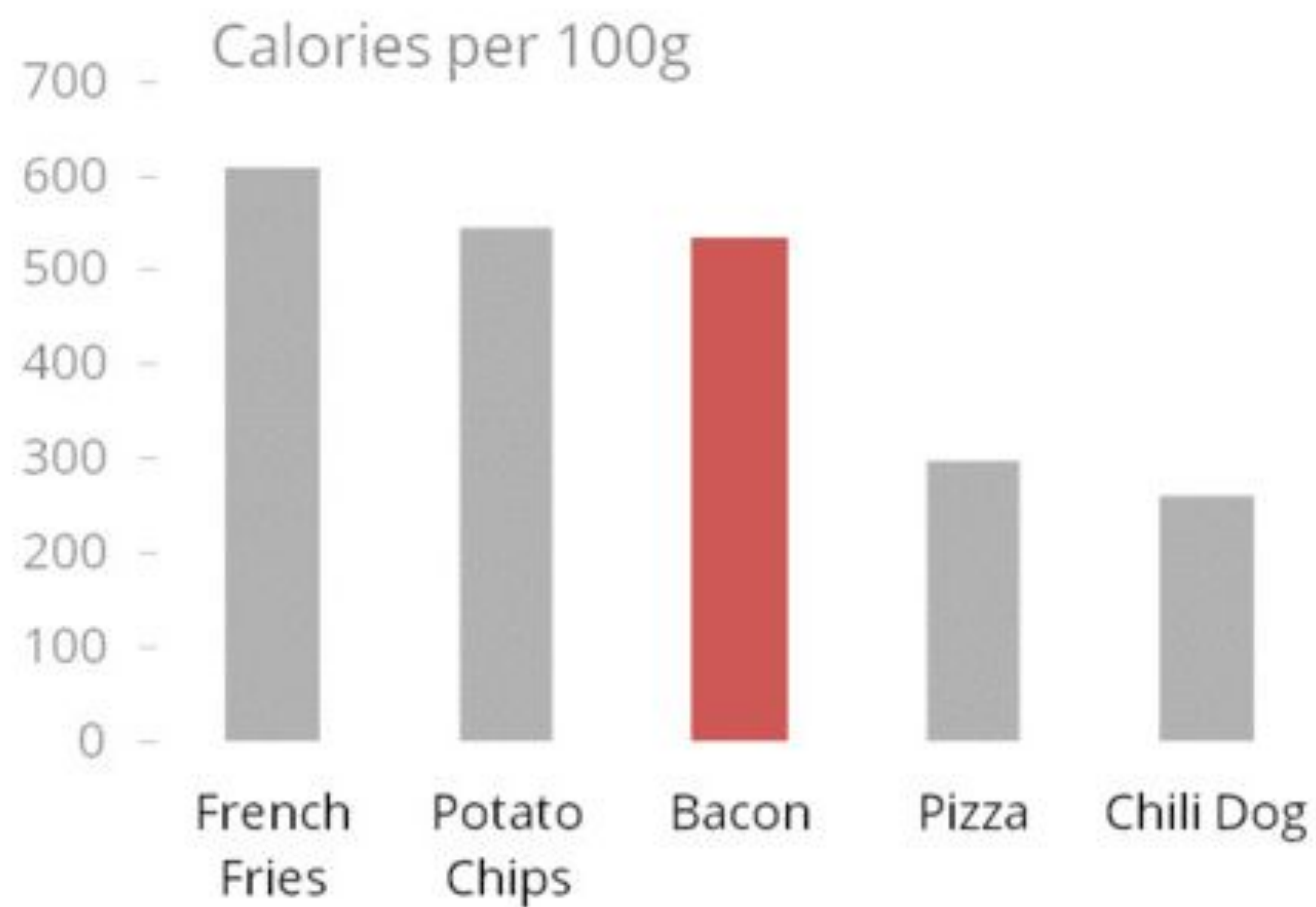
Or remove lines



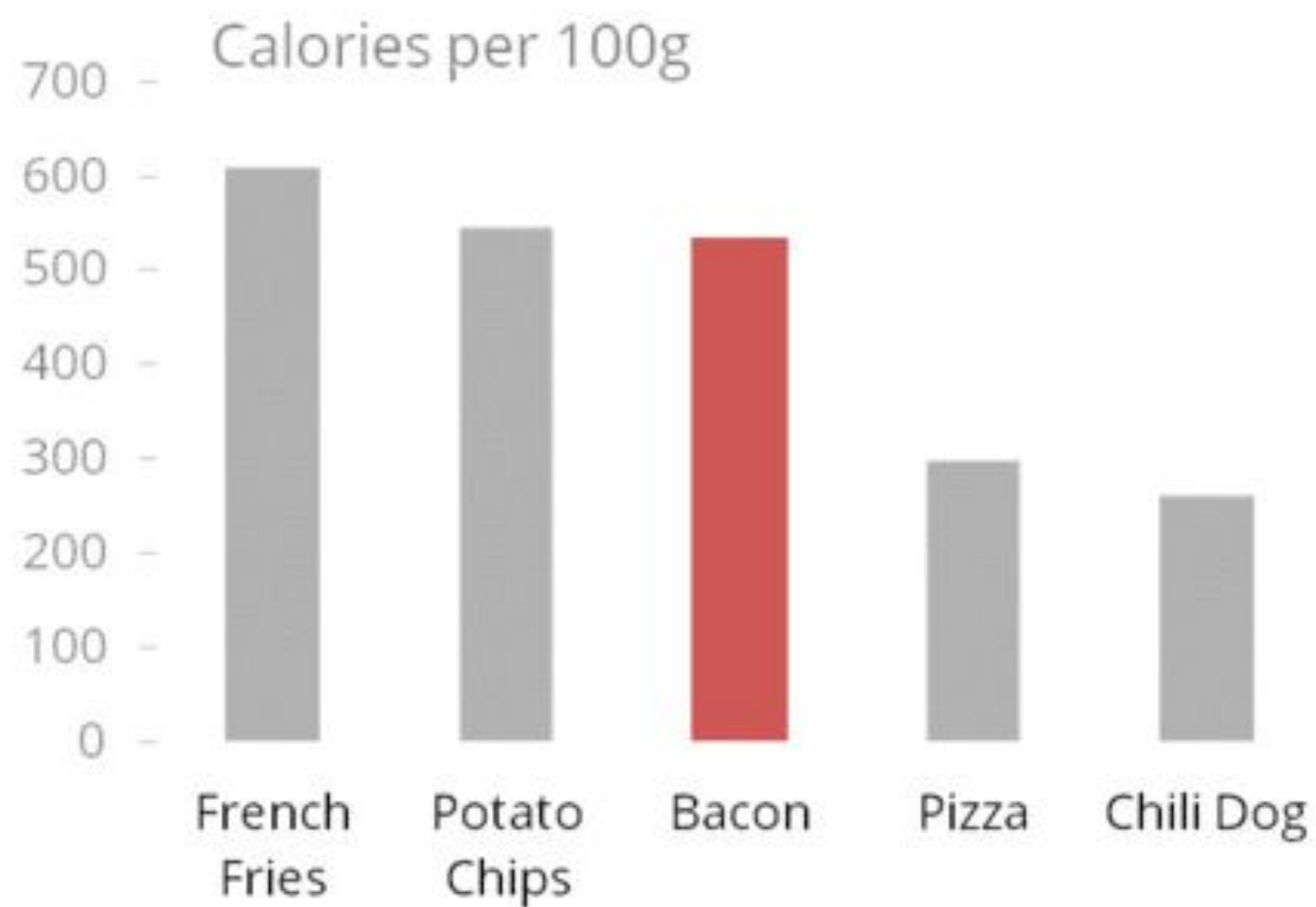
Or remove lines



Or remove lines

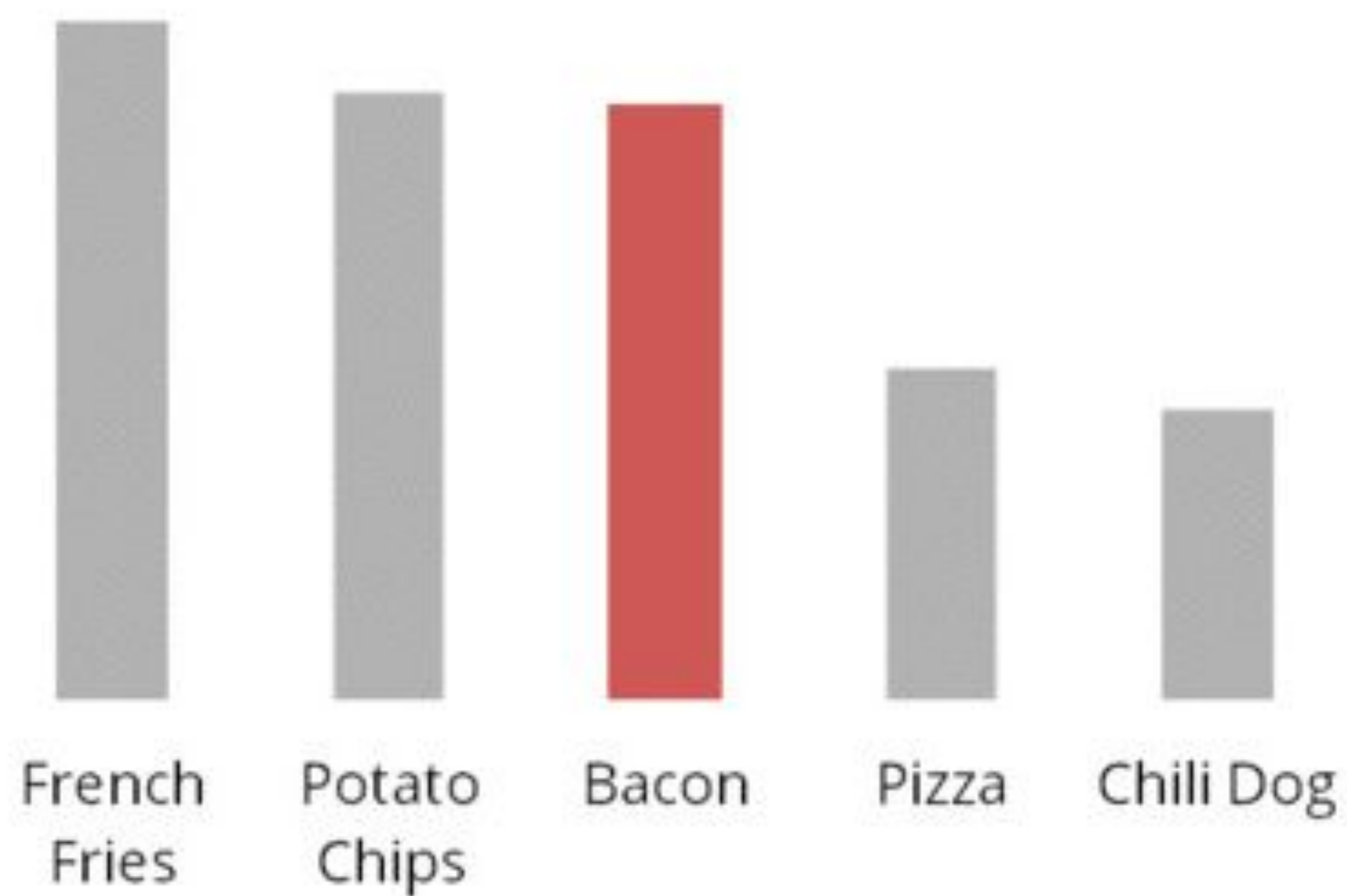


Direct label



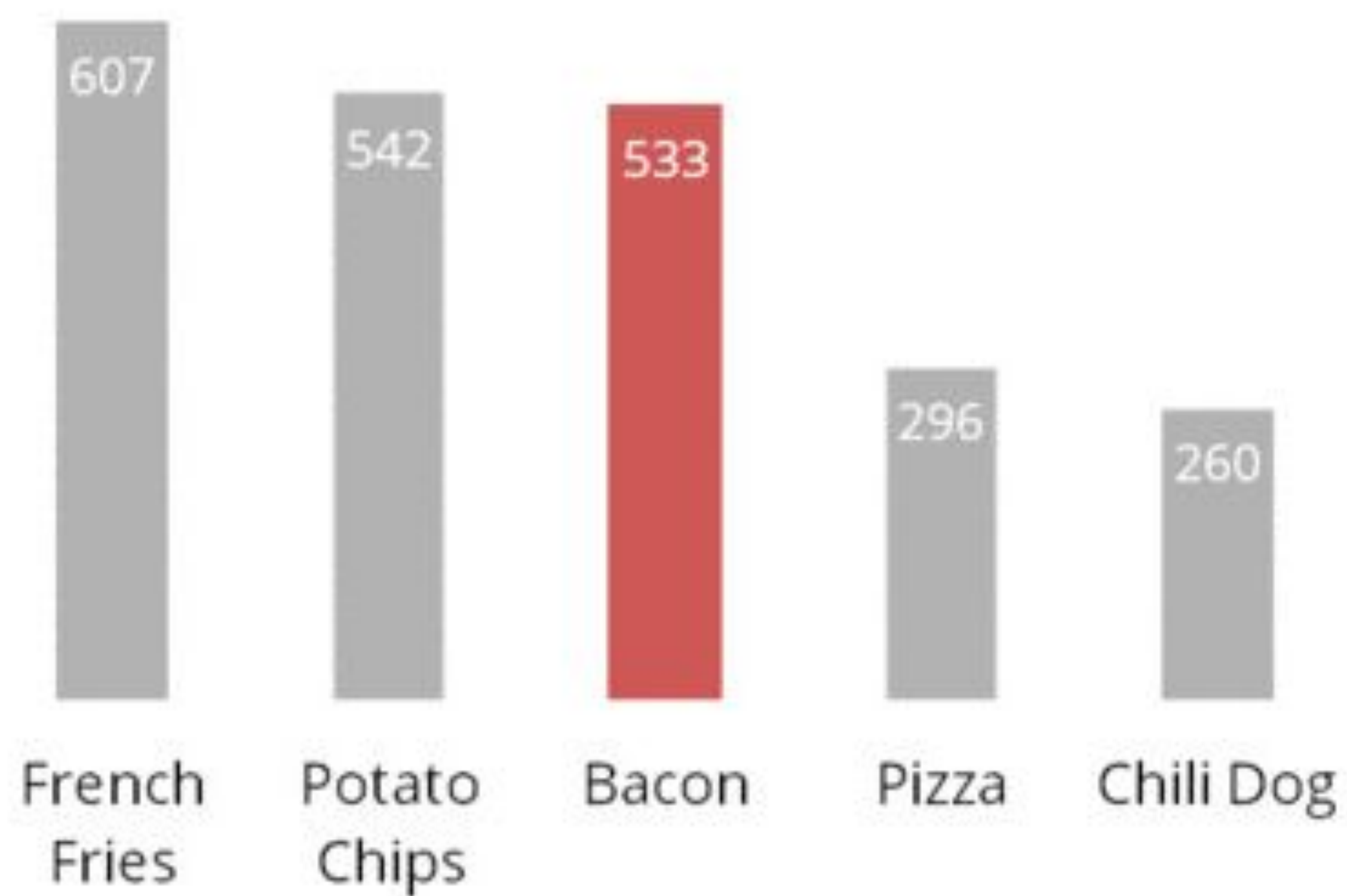
Direct label

Calories per 100g

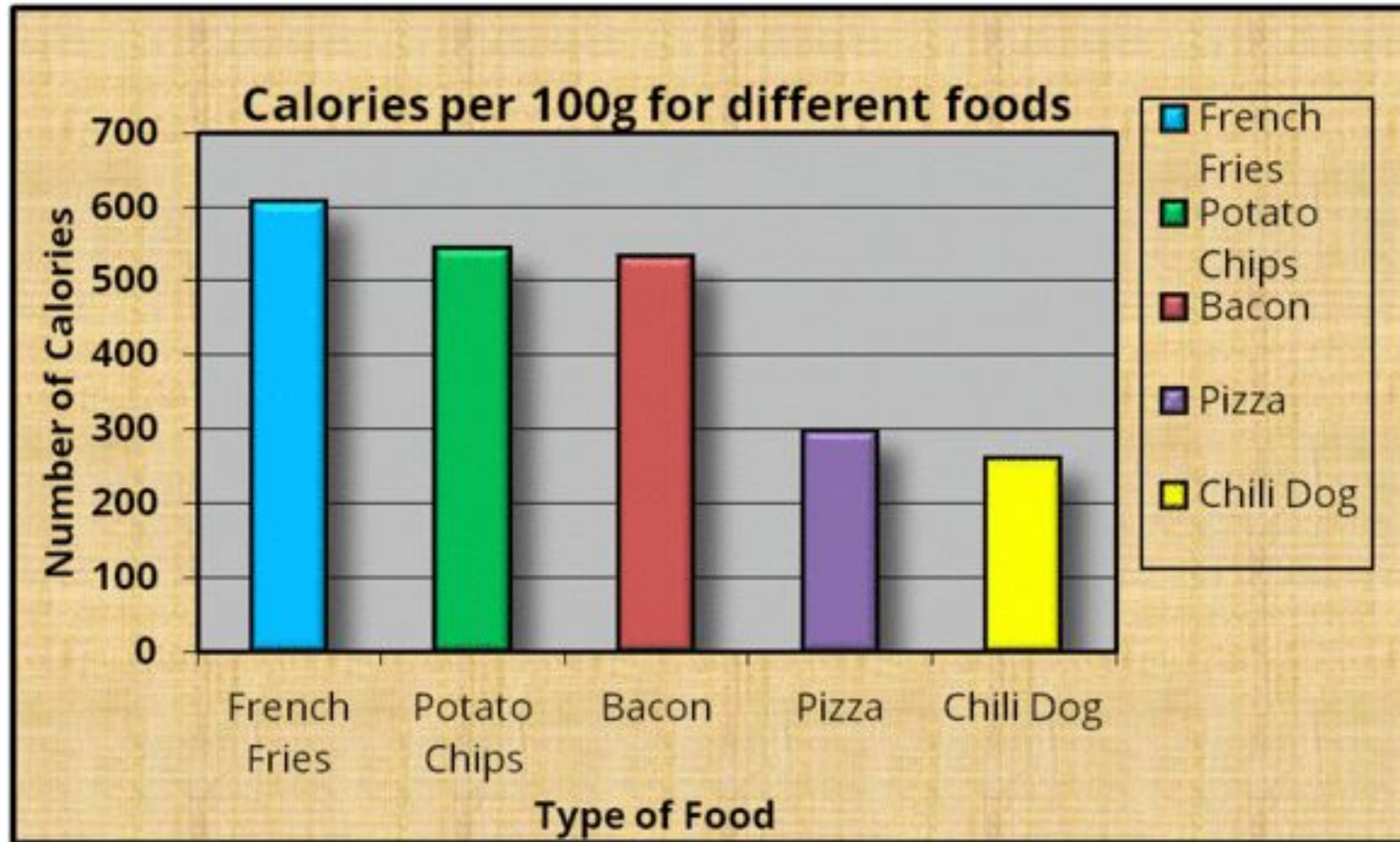


Direct label

Calories per 100g

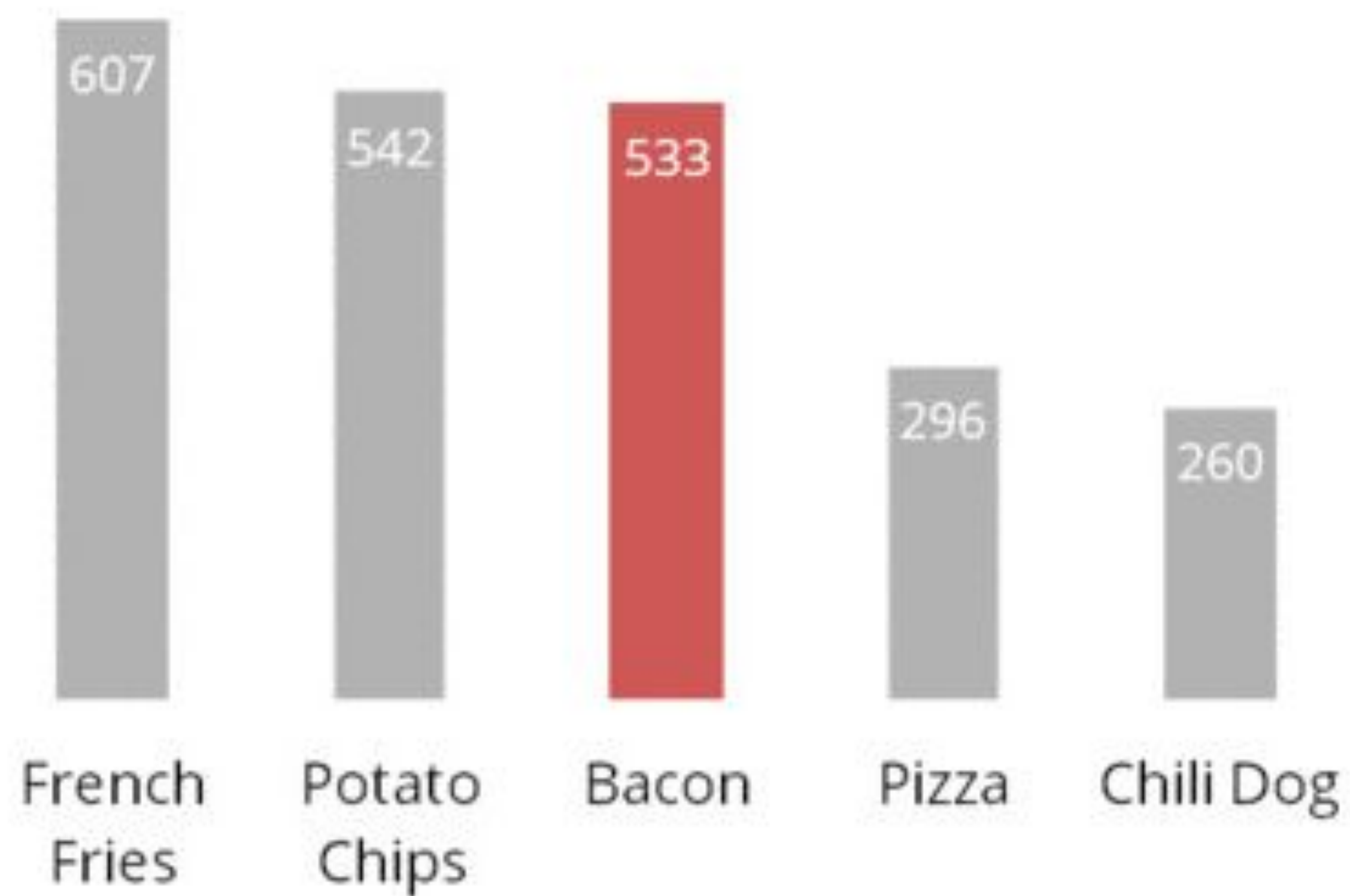


Before

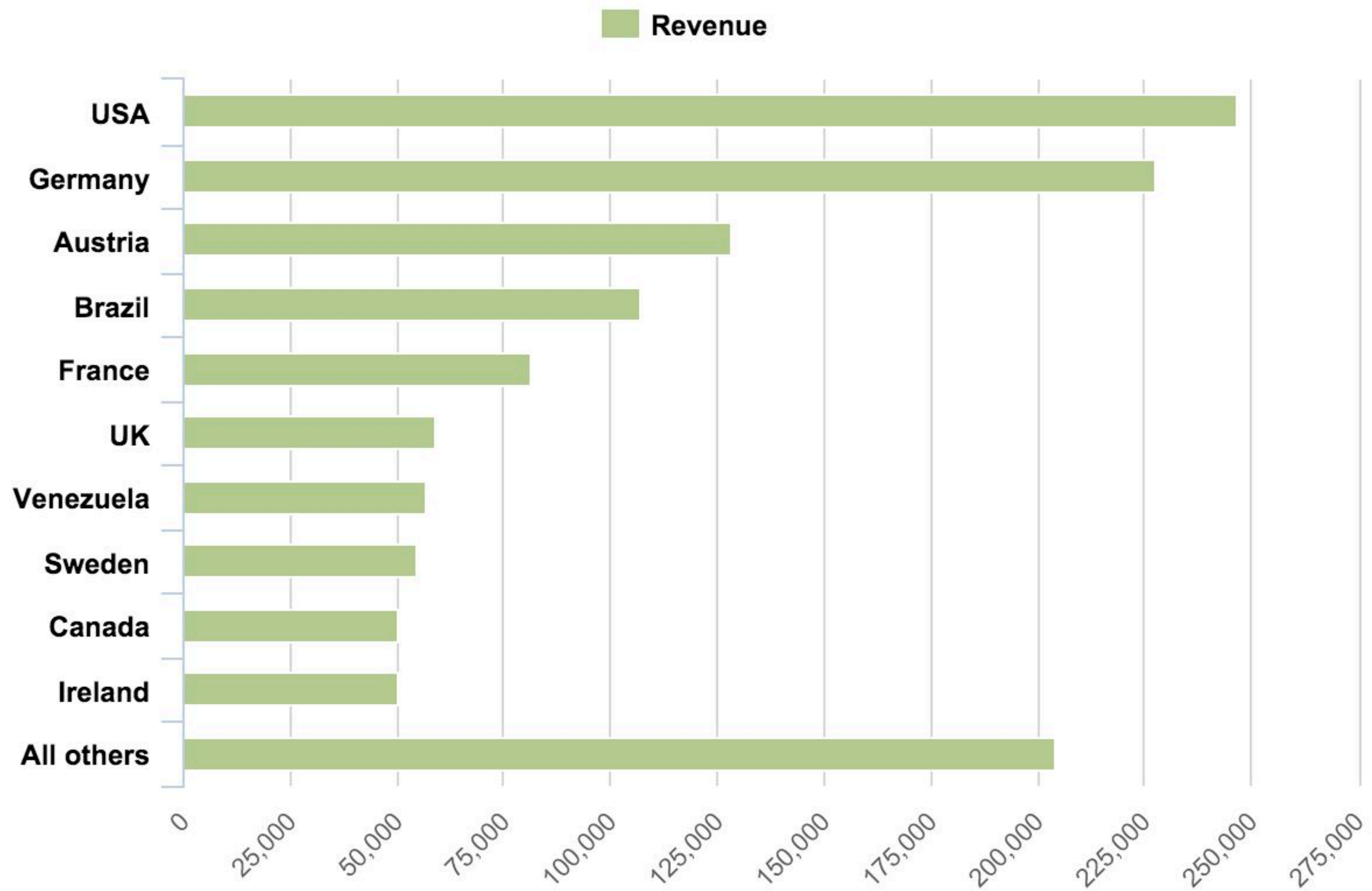


After

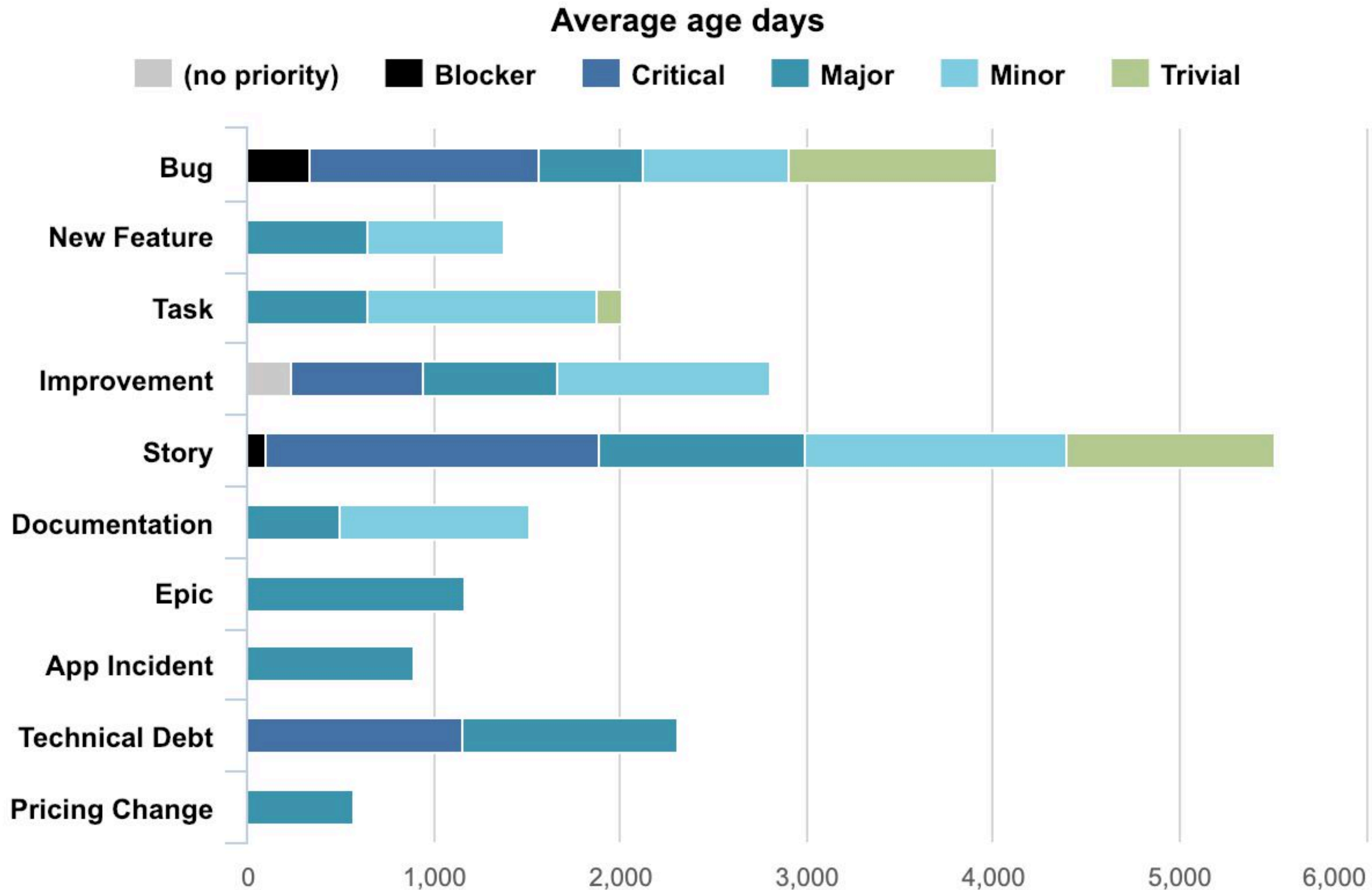
Calories per 100g



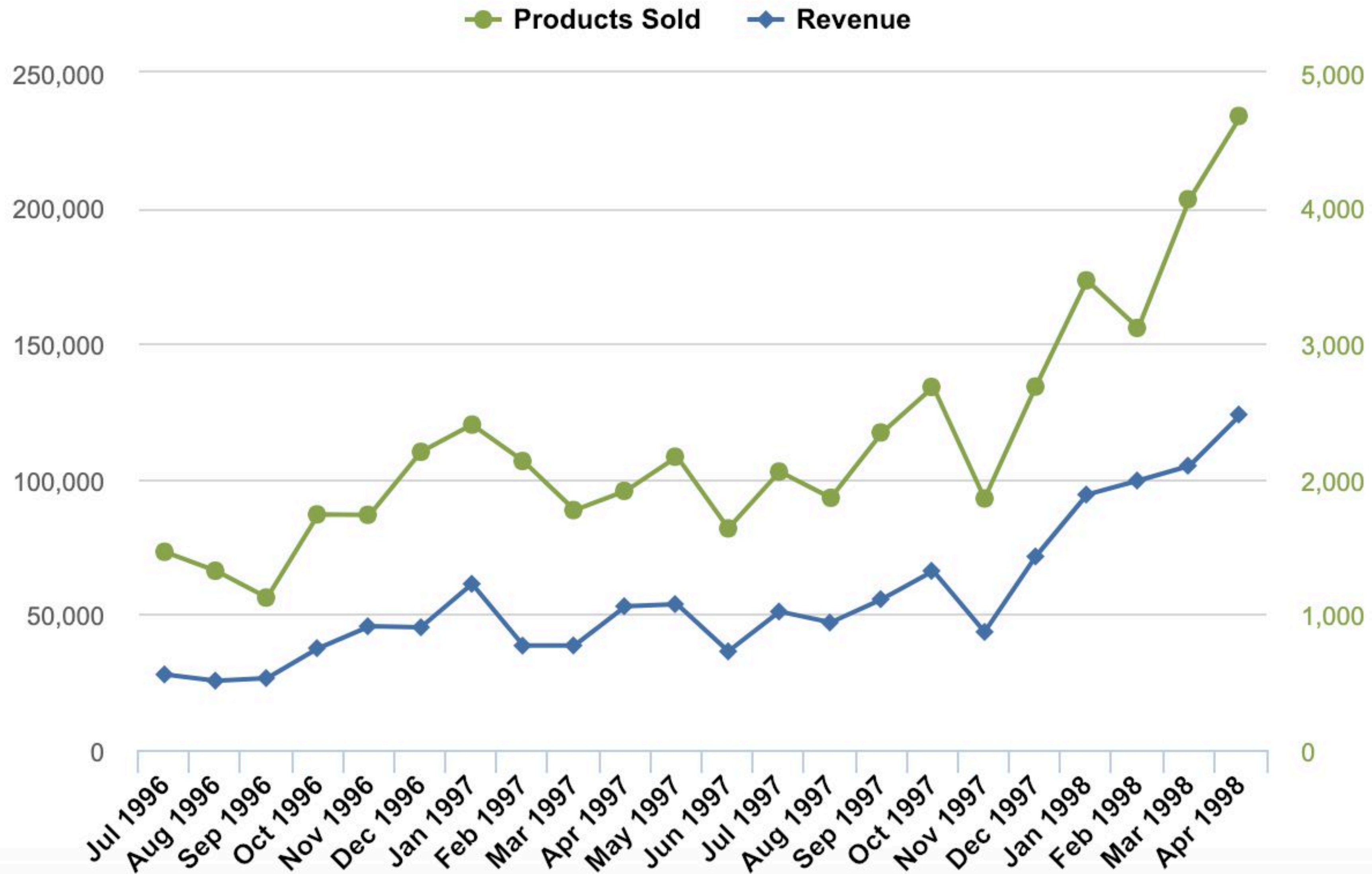
Bar Charts



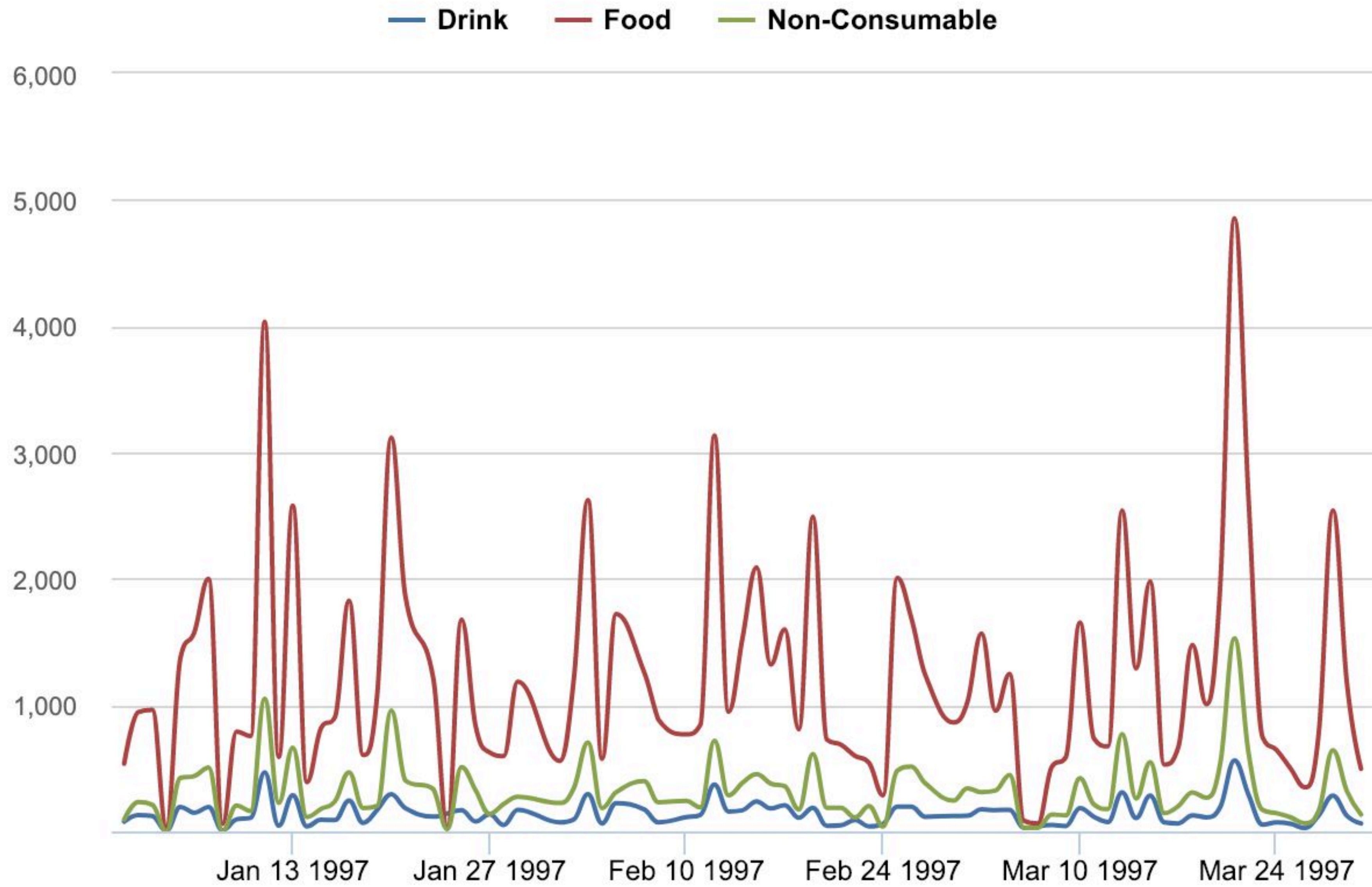
Stacked Bar Charts



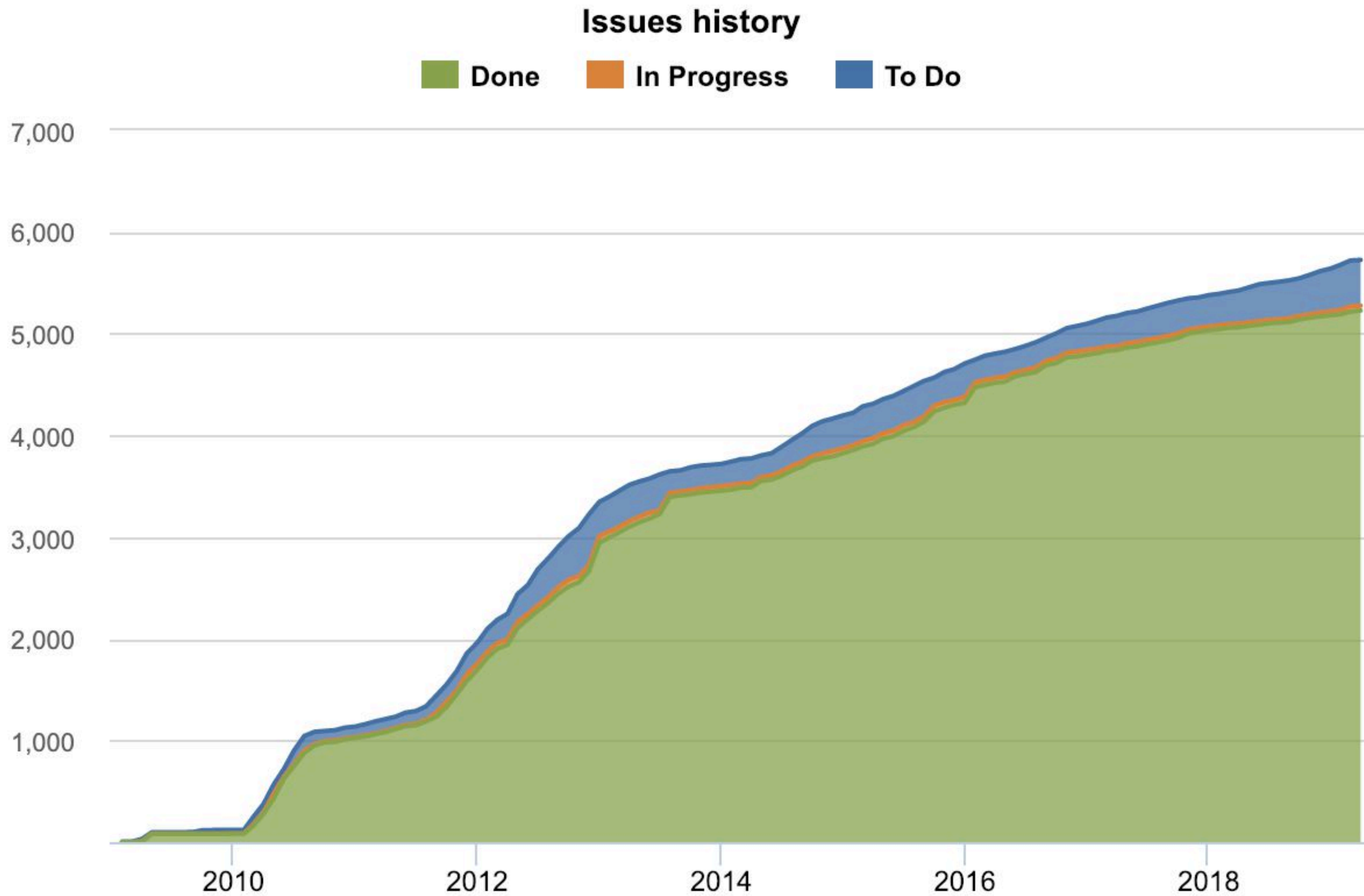
Line Charts



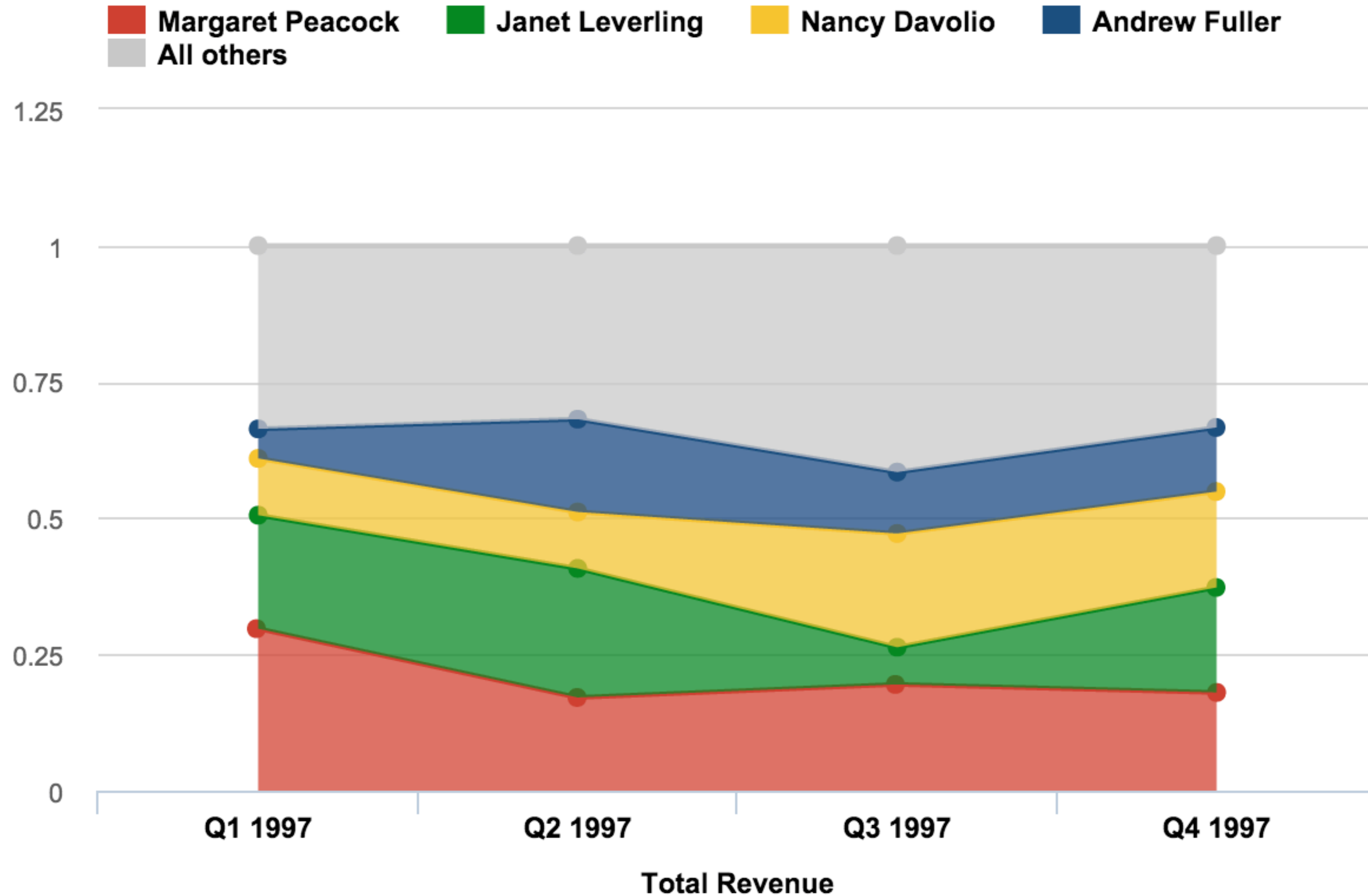
TimeLine Charts



Area Charts



Stacked Area Charts



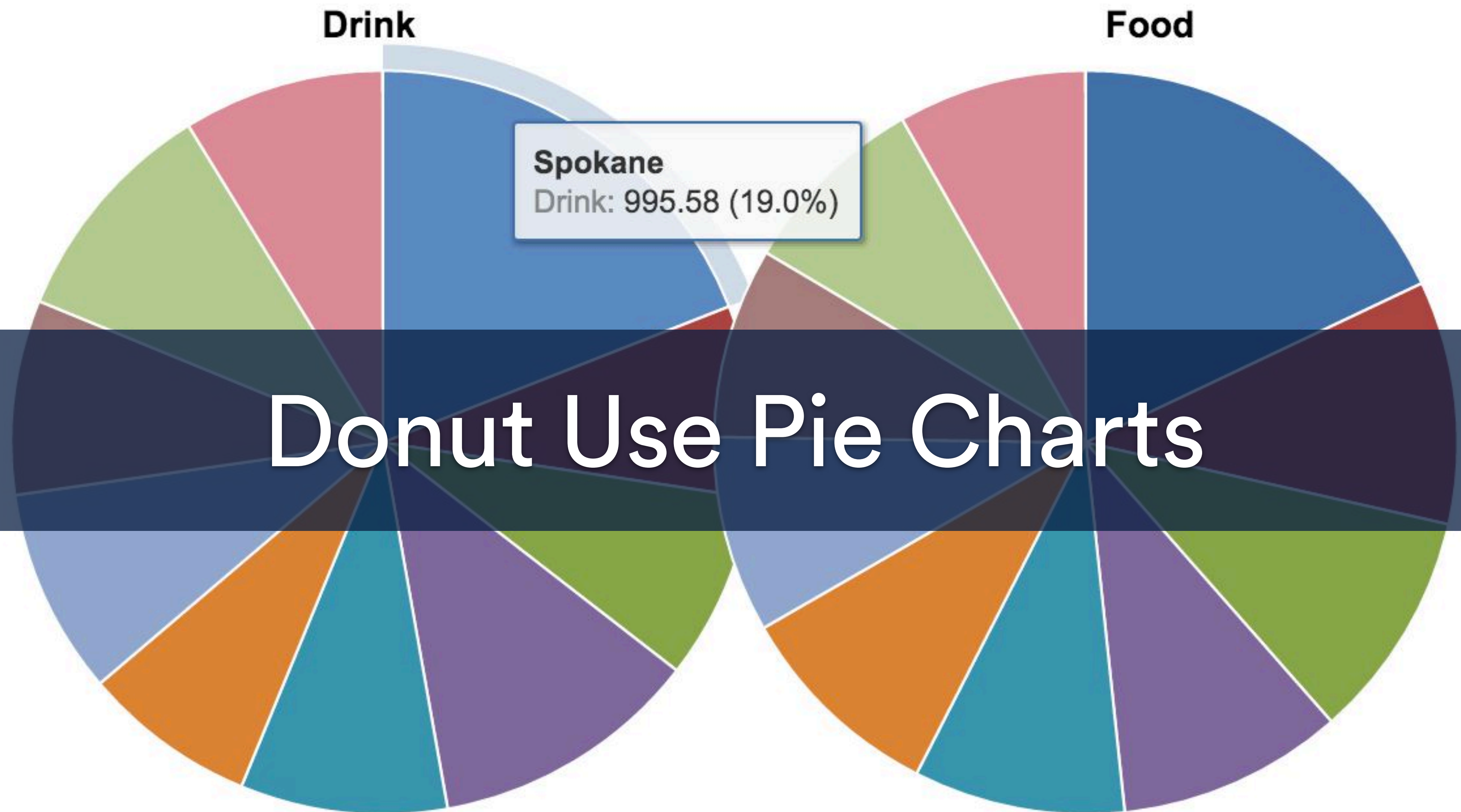
DO'S

- Present continuous data in an interval scale, where intervals are equal in size.
- Emphasize rate of change or an overall trend
- Time from left to right – always.
- Remove guidelines to emphasize the trend, rate of change, and to reduce distraction.

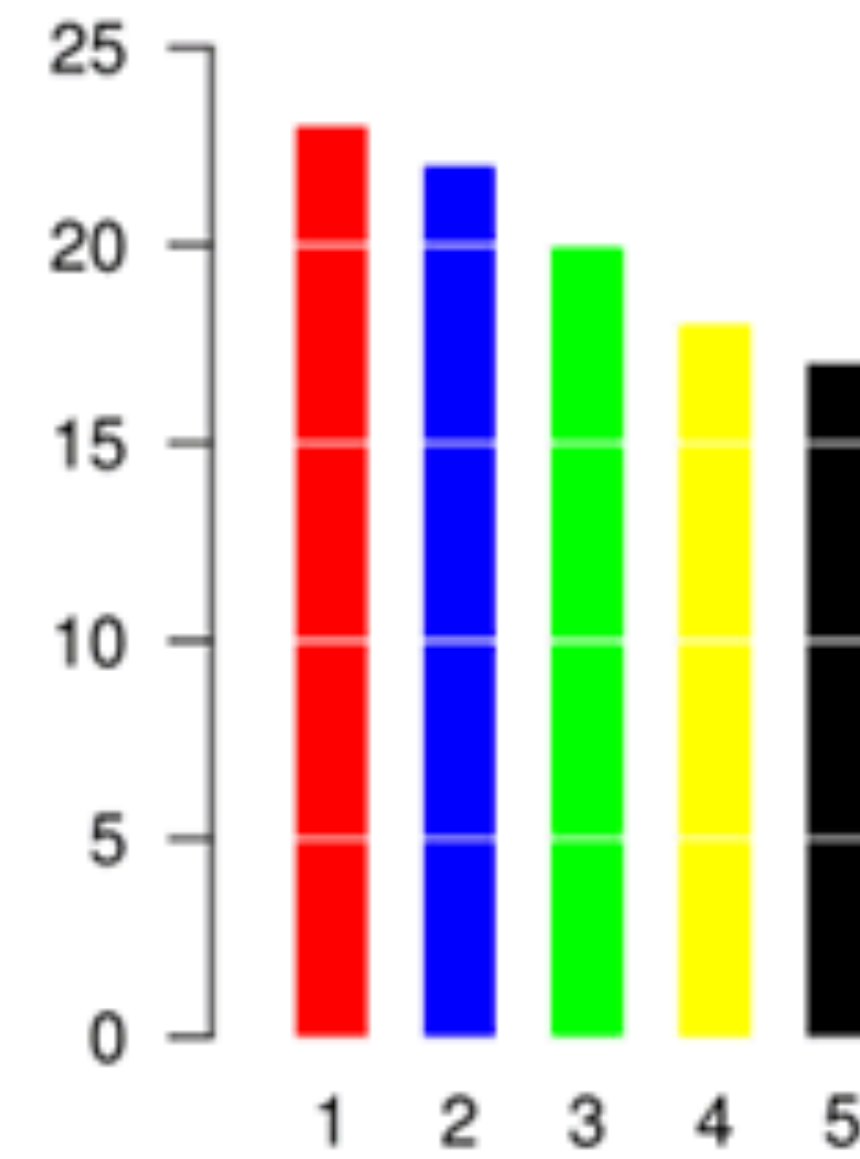
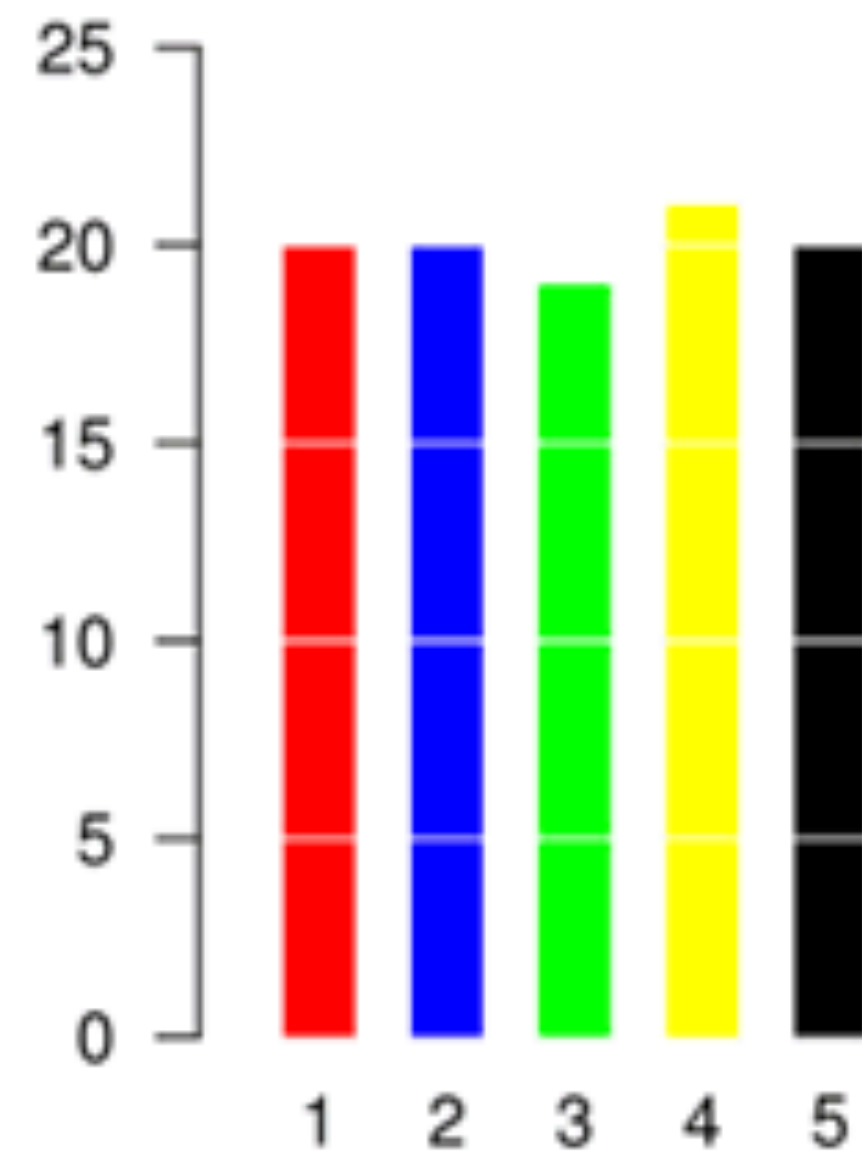
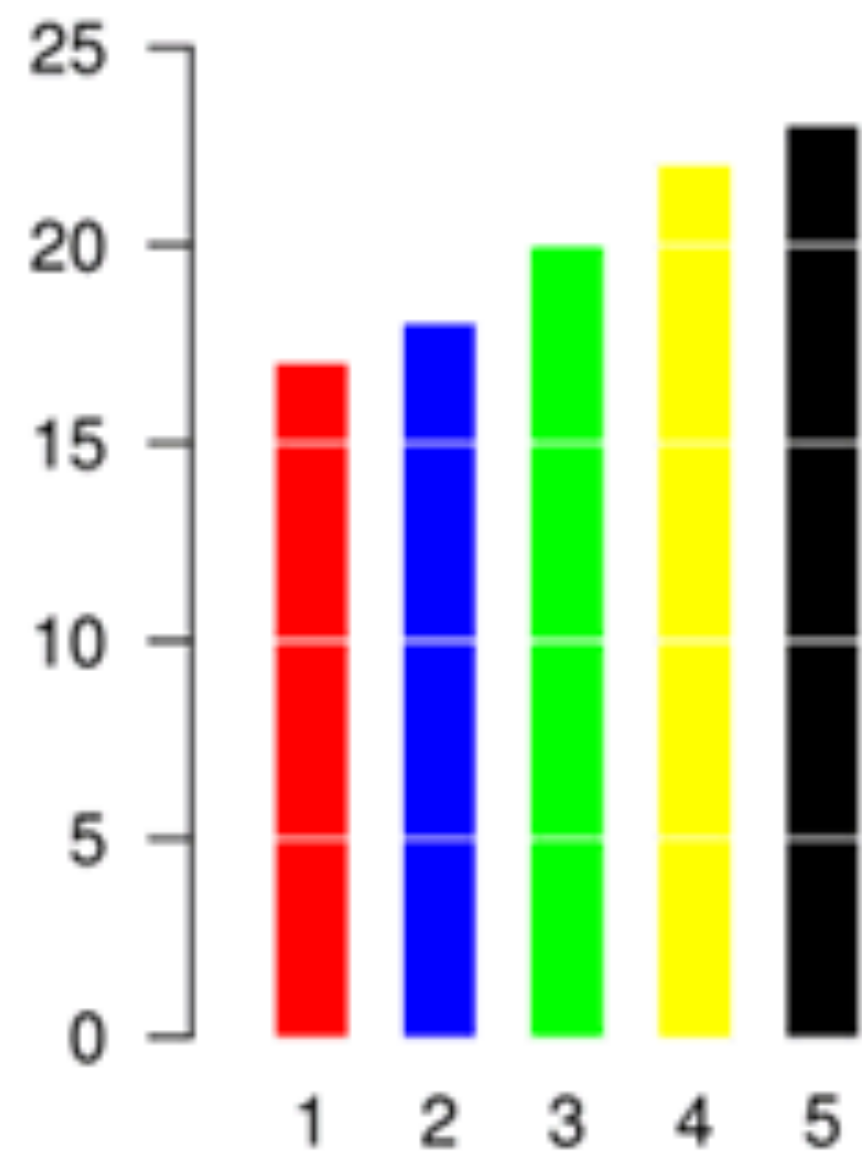
DON'TS

- Do not skip values
- Don't squeeze or expand line charts
- No more than a 45-degree slope.

Pie Charts and Donut Charts

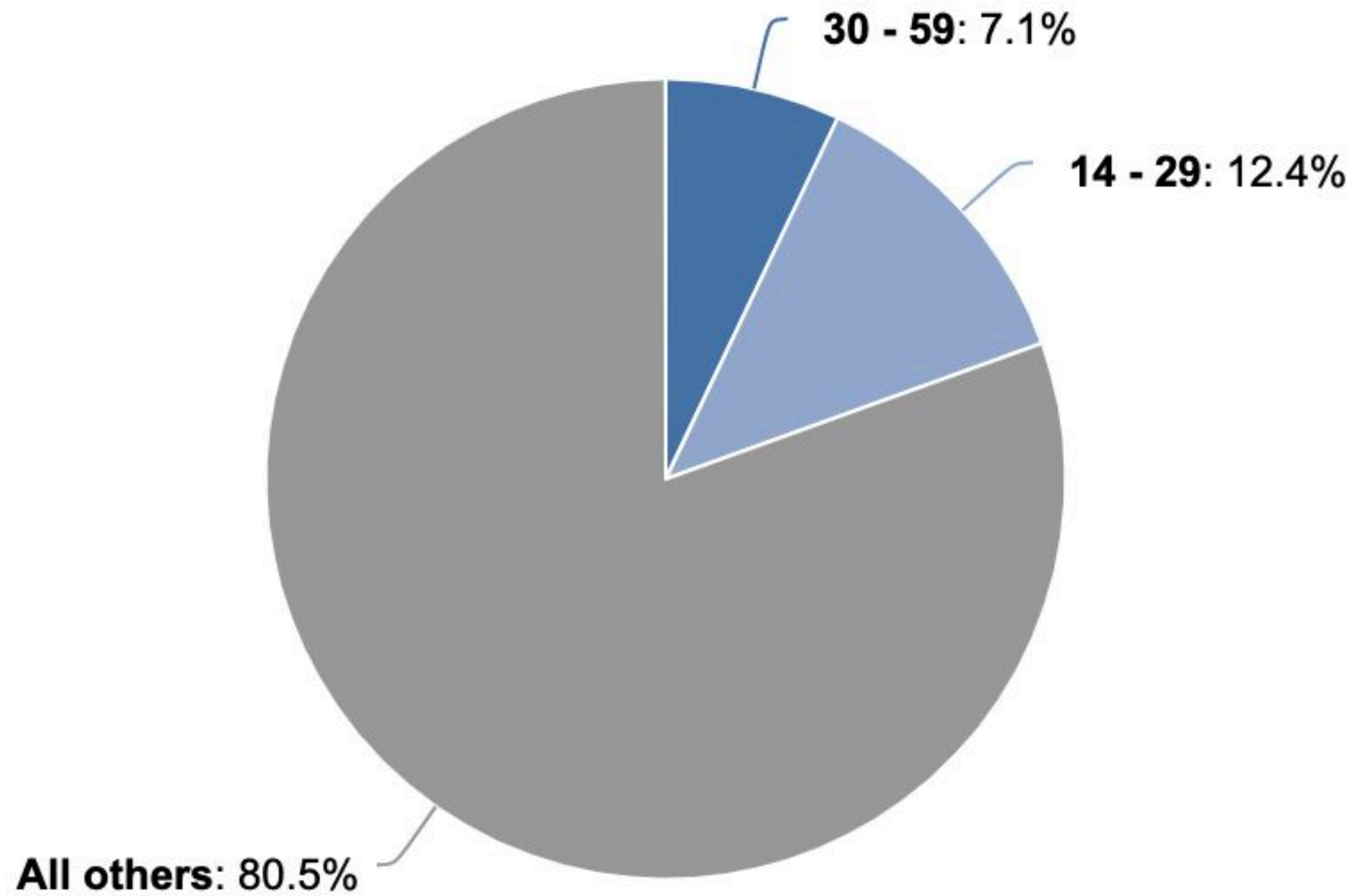


Pie Charts



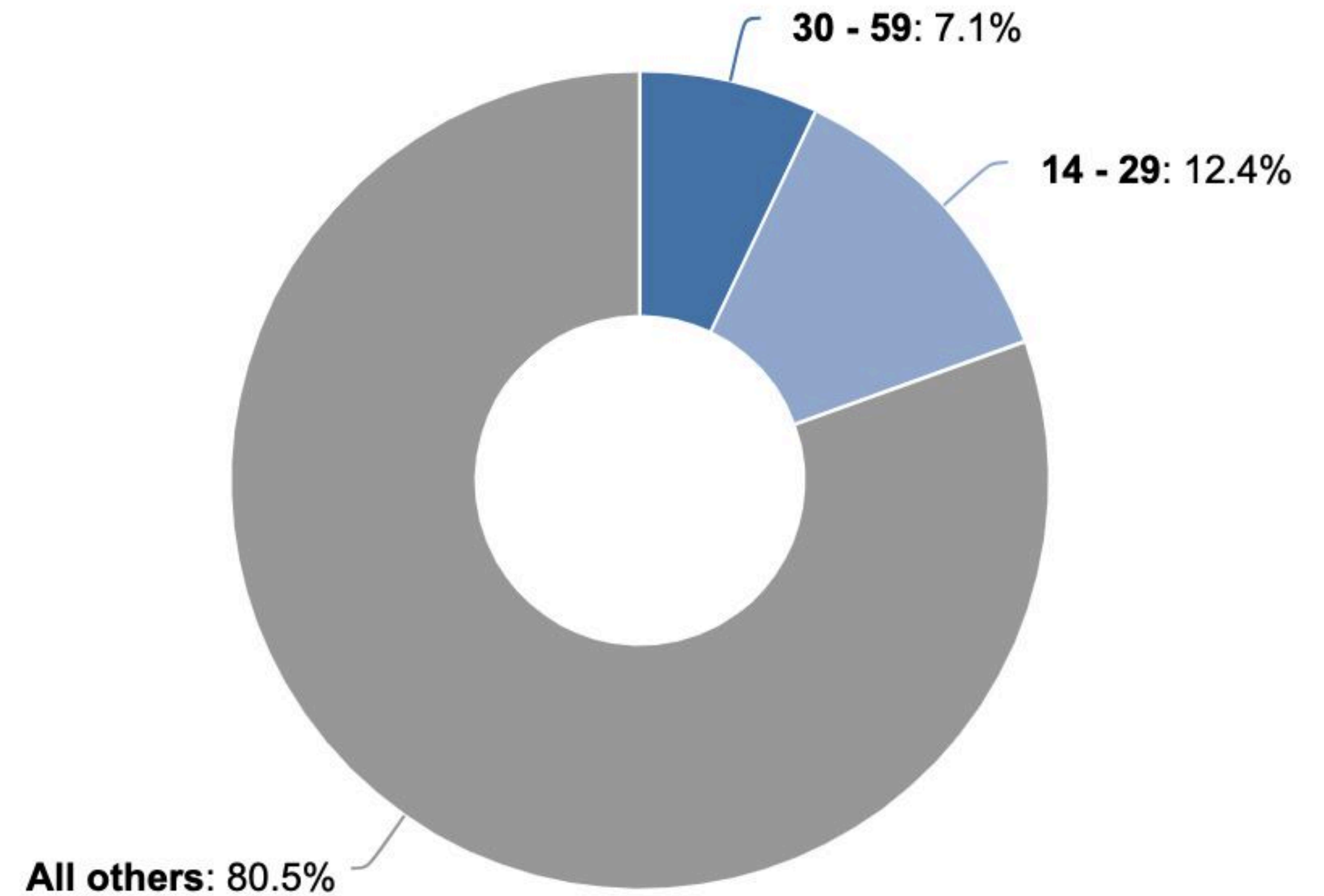
Better Use of Donut Charts

Issues resolved: 5,155



30 - 59 14 - 29 All others

Issues resolved



All others: 80.5%

30 - 59 14 - 29 All others

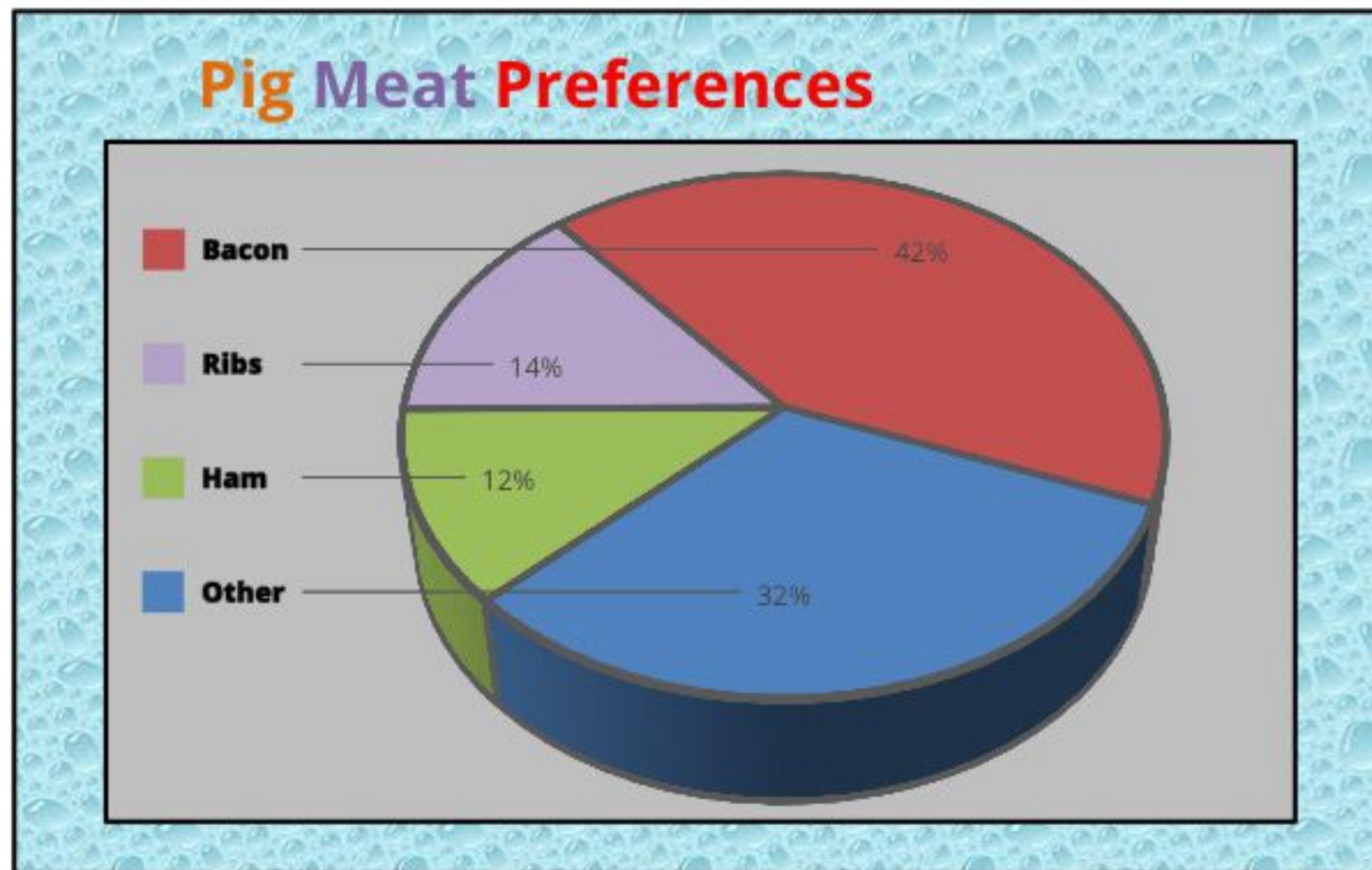
DO'S

- Make sure that the total sum of all segments equals 100 percent.
- Use pie charts only if you have less than 6 categories, unless there's a clear winner you want to focus on.
- Ideally, there should be only two categories, like men and women visiting your website, or only one category, like a market share of your company, compared to the whole market.

DON'TS

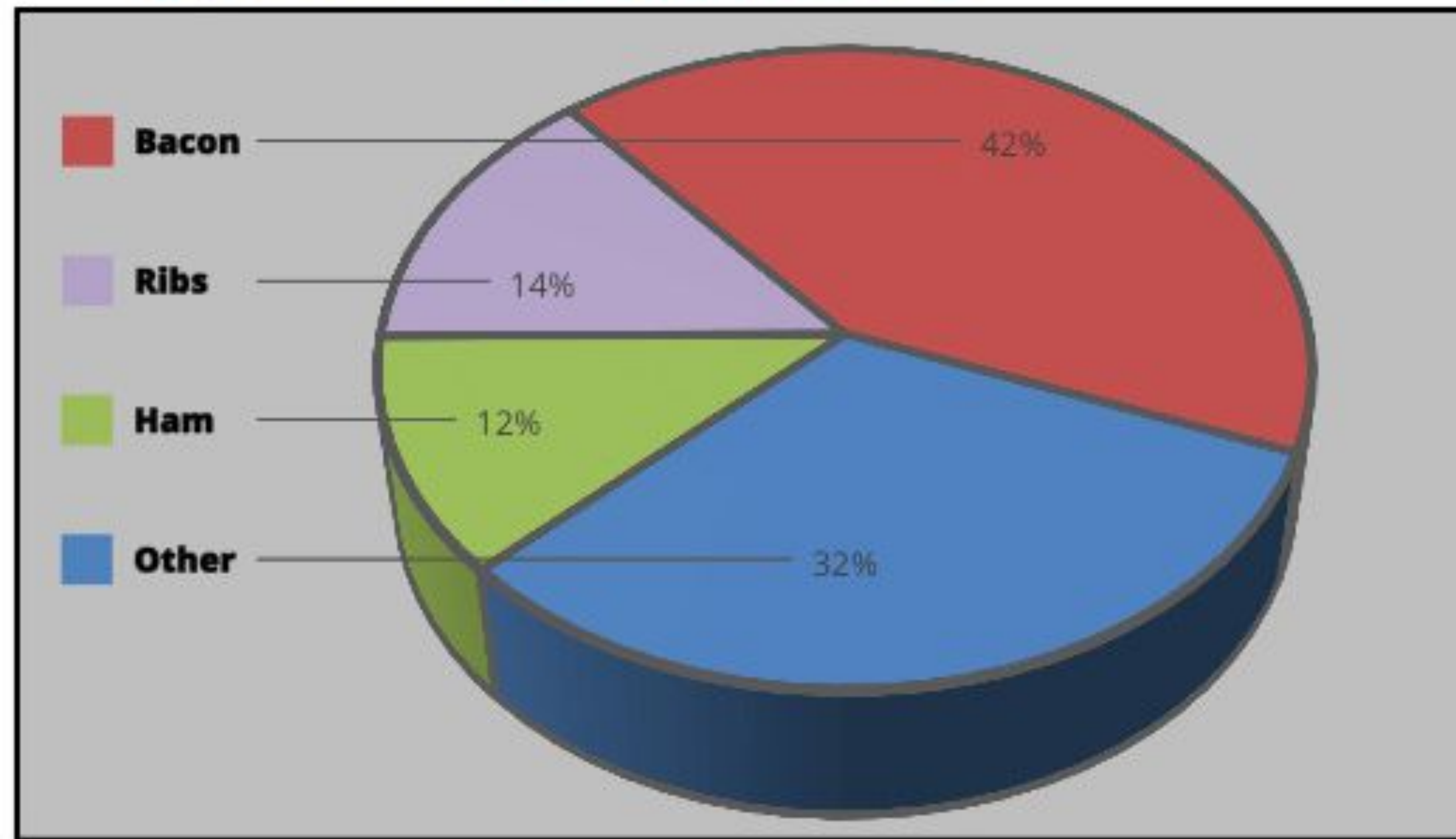
- Don't use a pie chart if the category values are almost identical or completely different.
- Don't use 3D or blow apart effects — they reduce comprehension and show incorrect proportions.
- Don't use a pie charts to compare individual sections to each other or to represent exact values.

Remove backgrounds

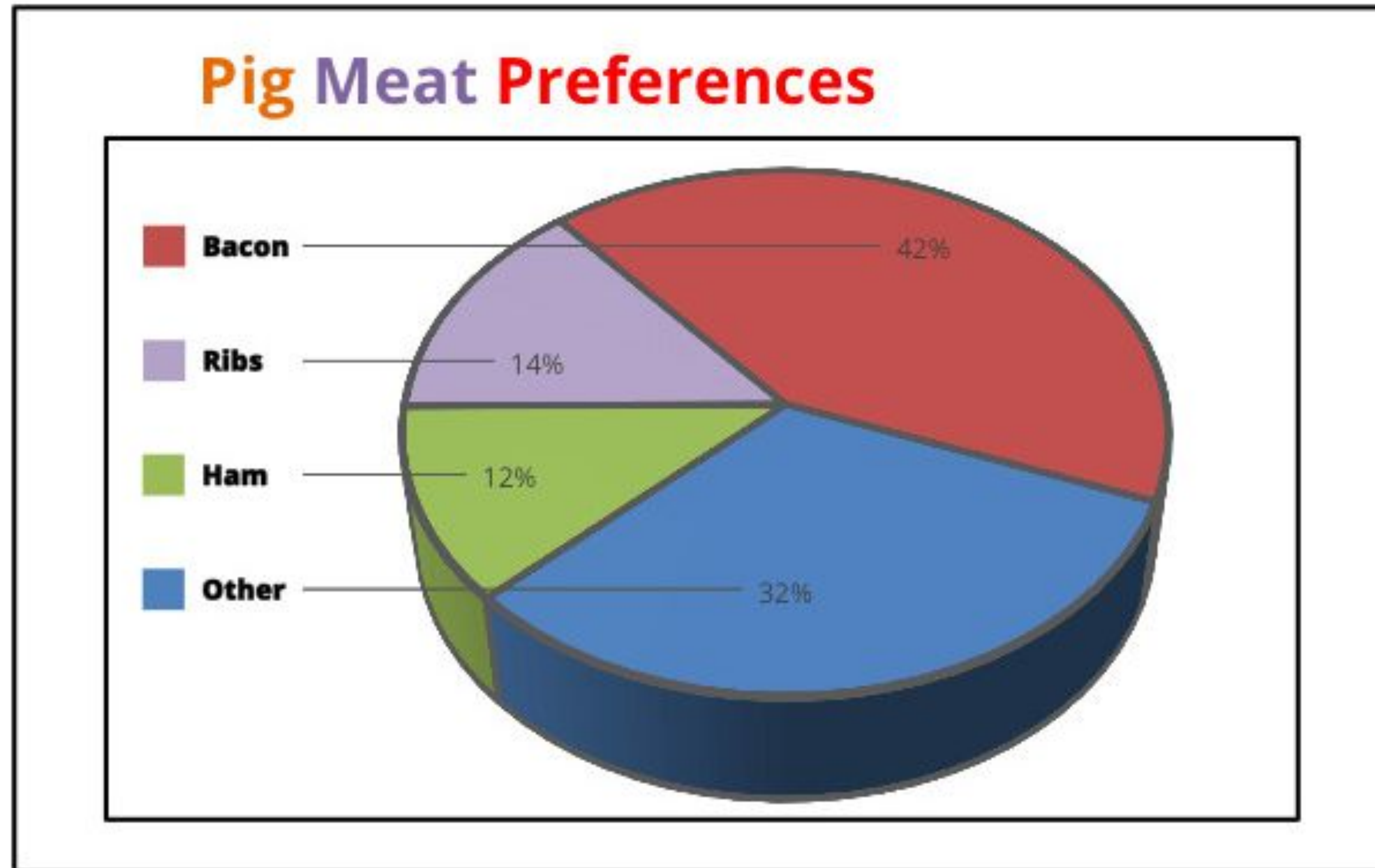


Remove backgrounds

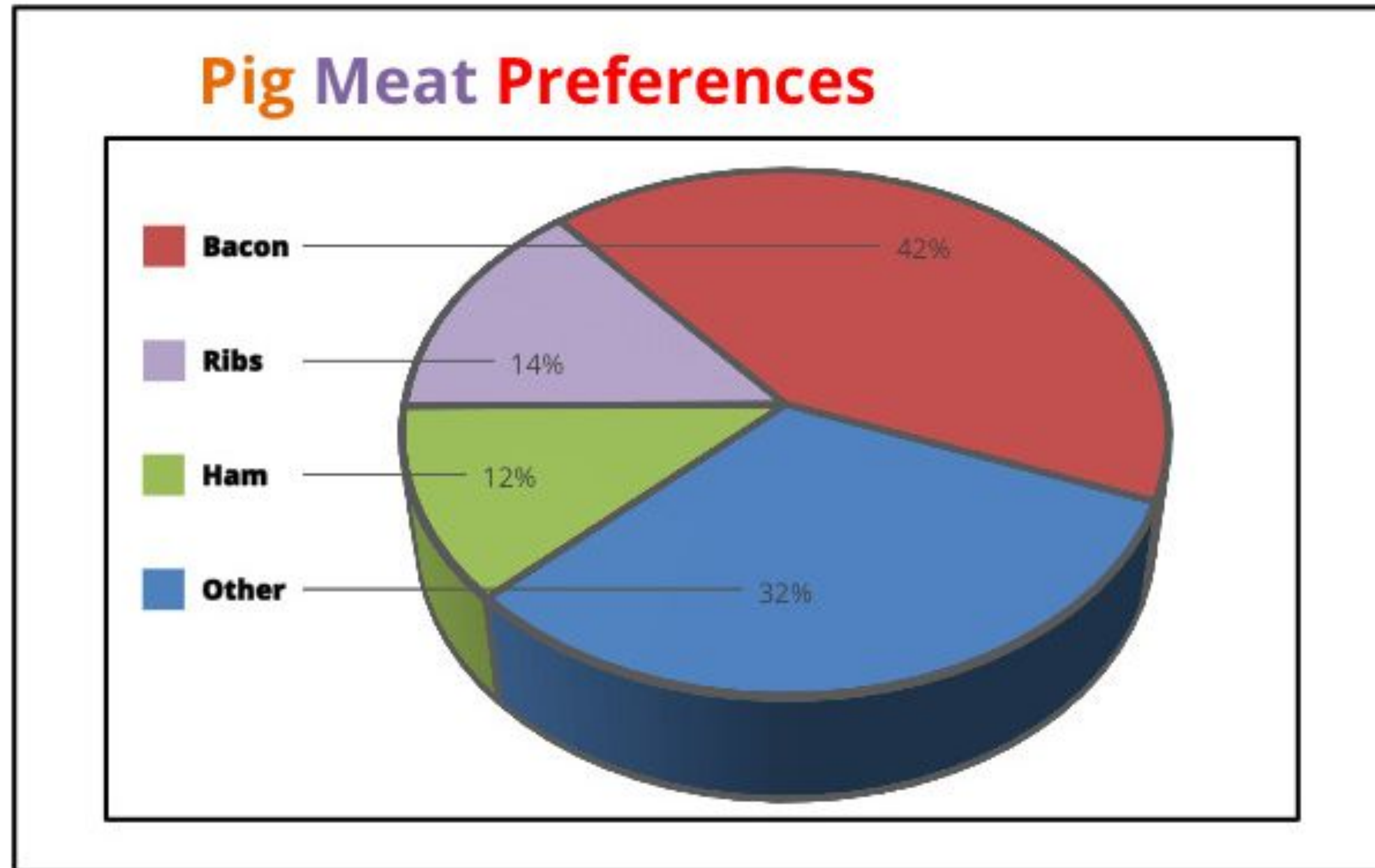
Pig Meat Preferences



Remove backgrounds

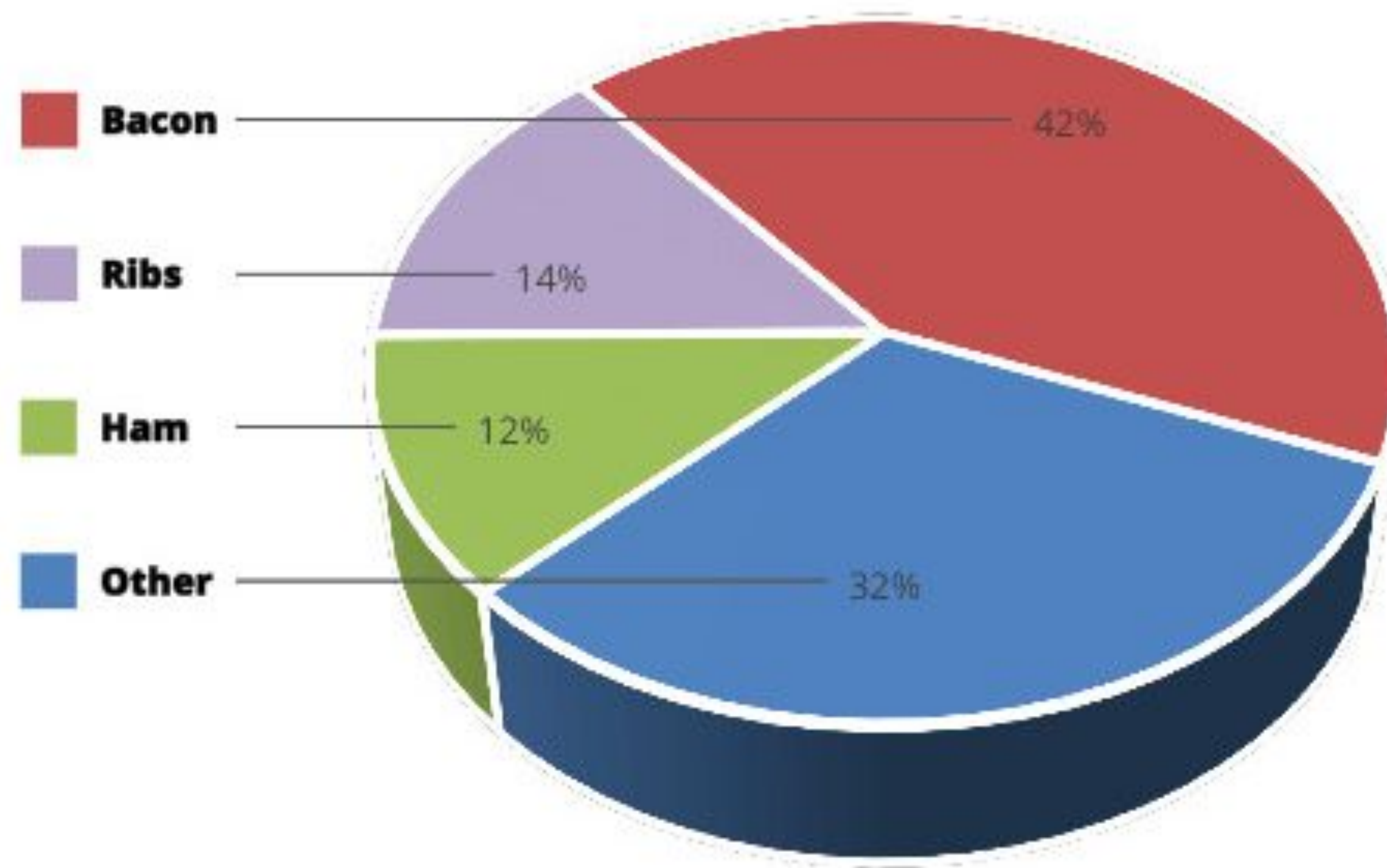


Remove borders



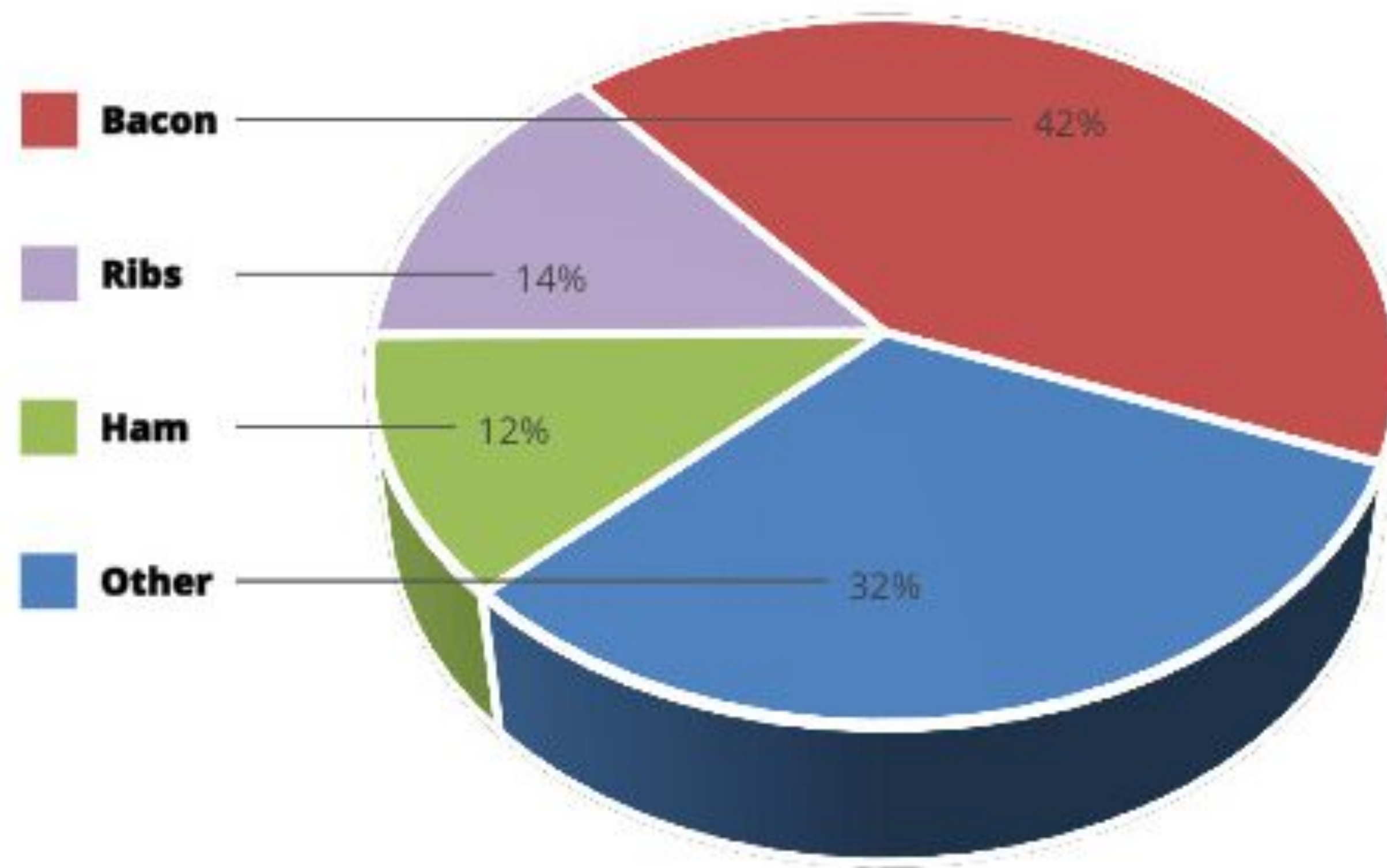
Remove borders

Pig Meat Preferences



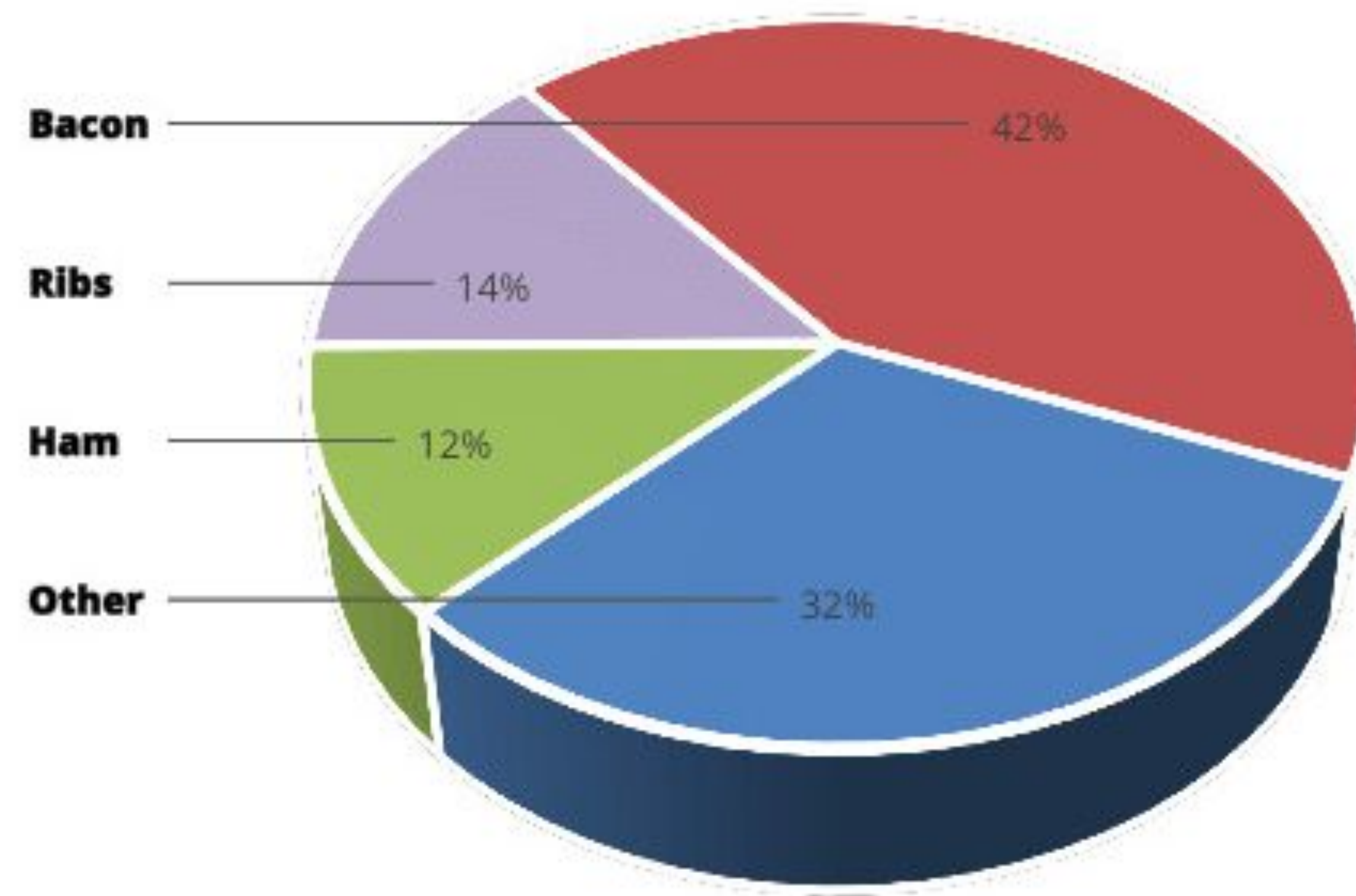
Remove redundant legend

Pig Meat Preferences



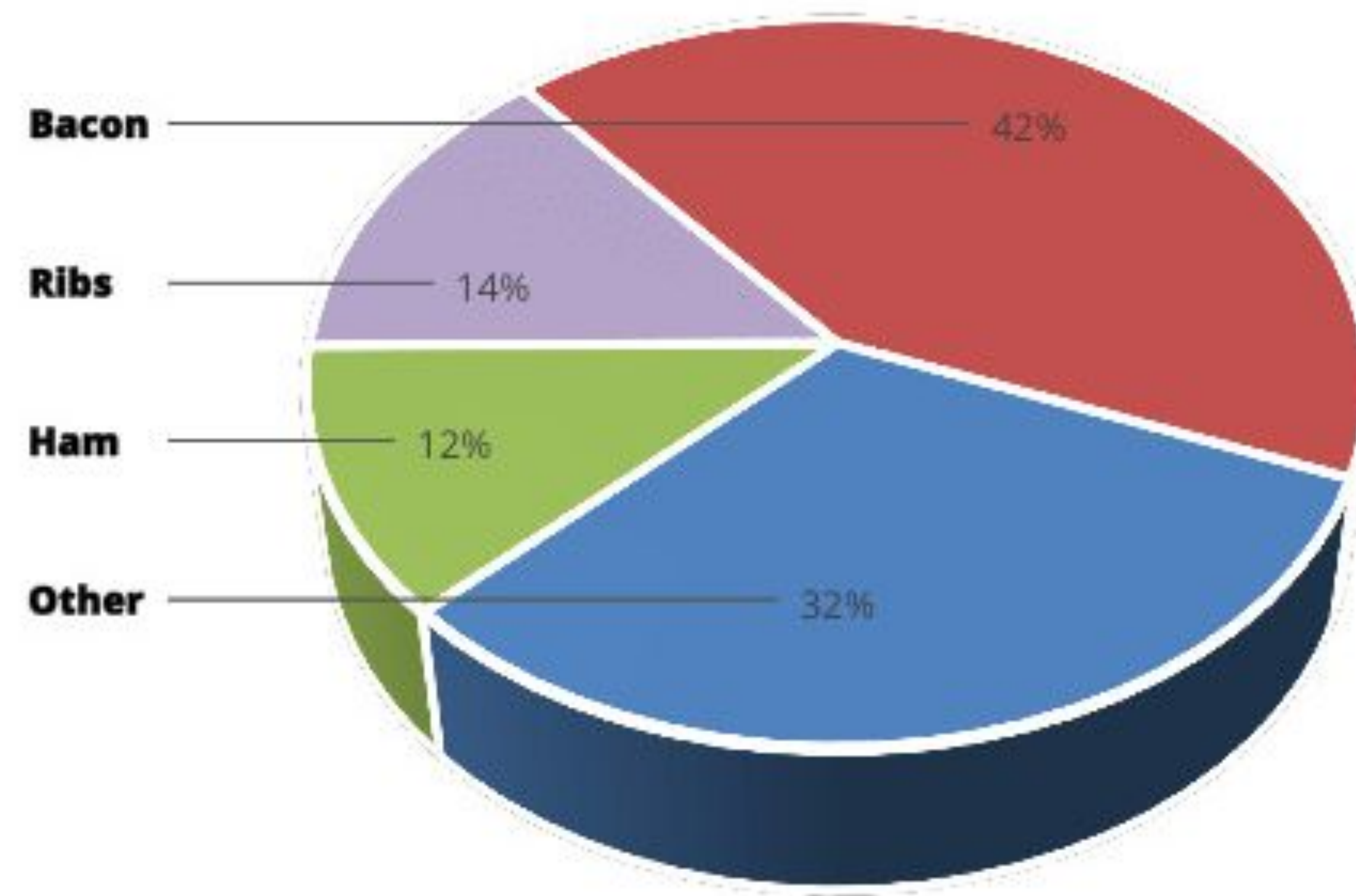
Remove redundant legend

Pig Meat Preferences



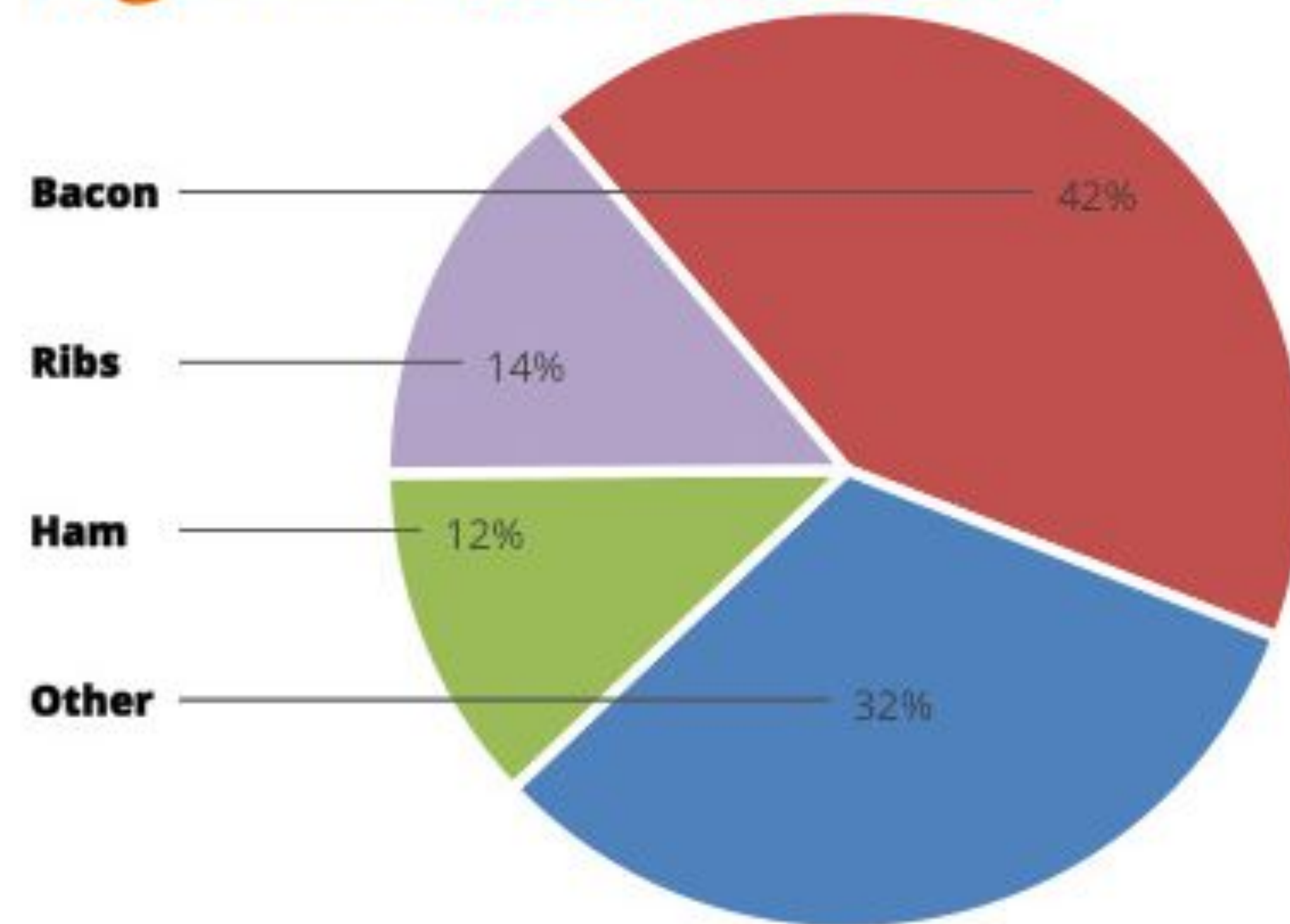
Remove 3D

Pig Meat Preferences



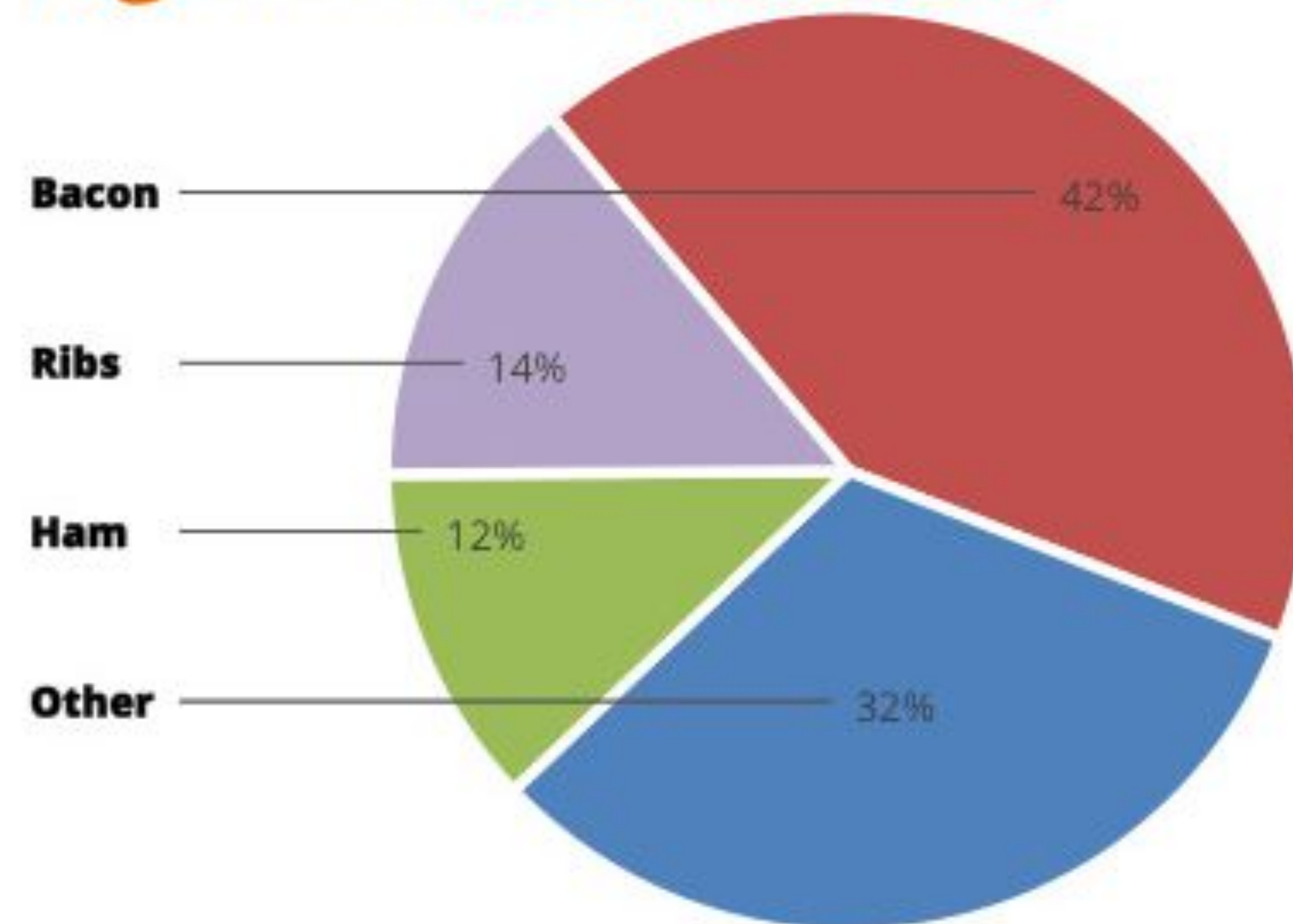
Remove 3D

Pig Meat Preferences



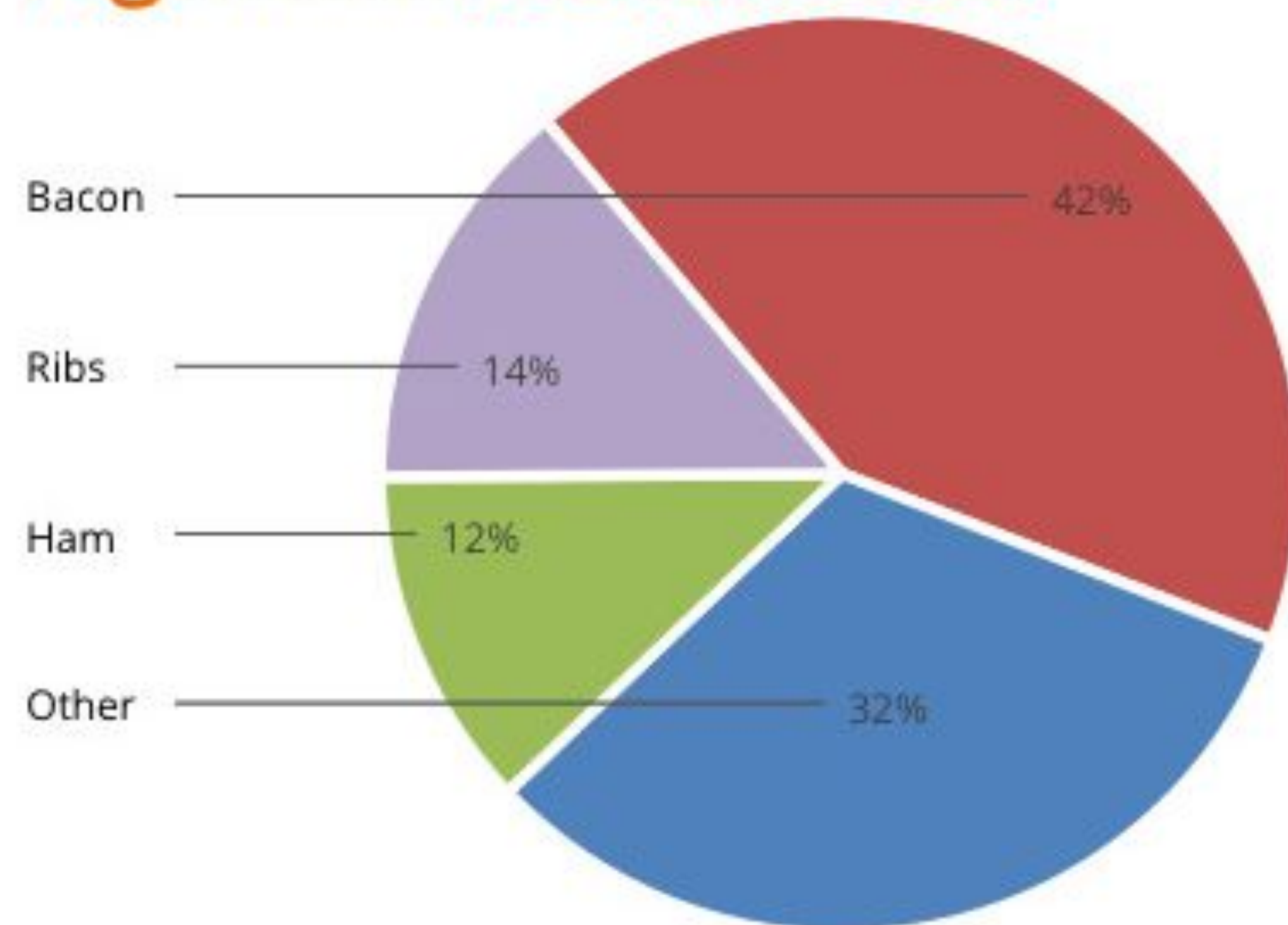
Remove Bolding

Pig Meat Preferences



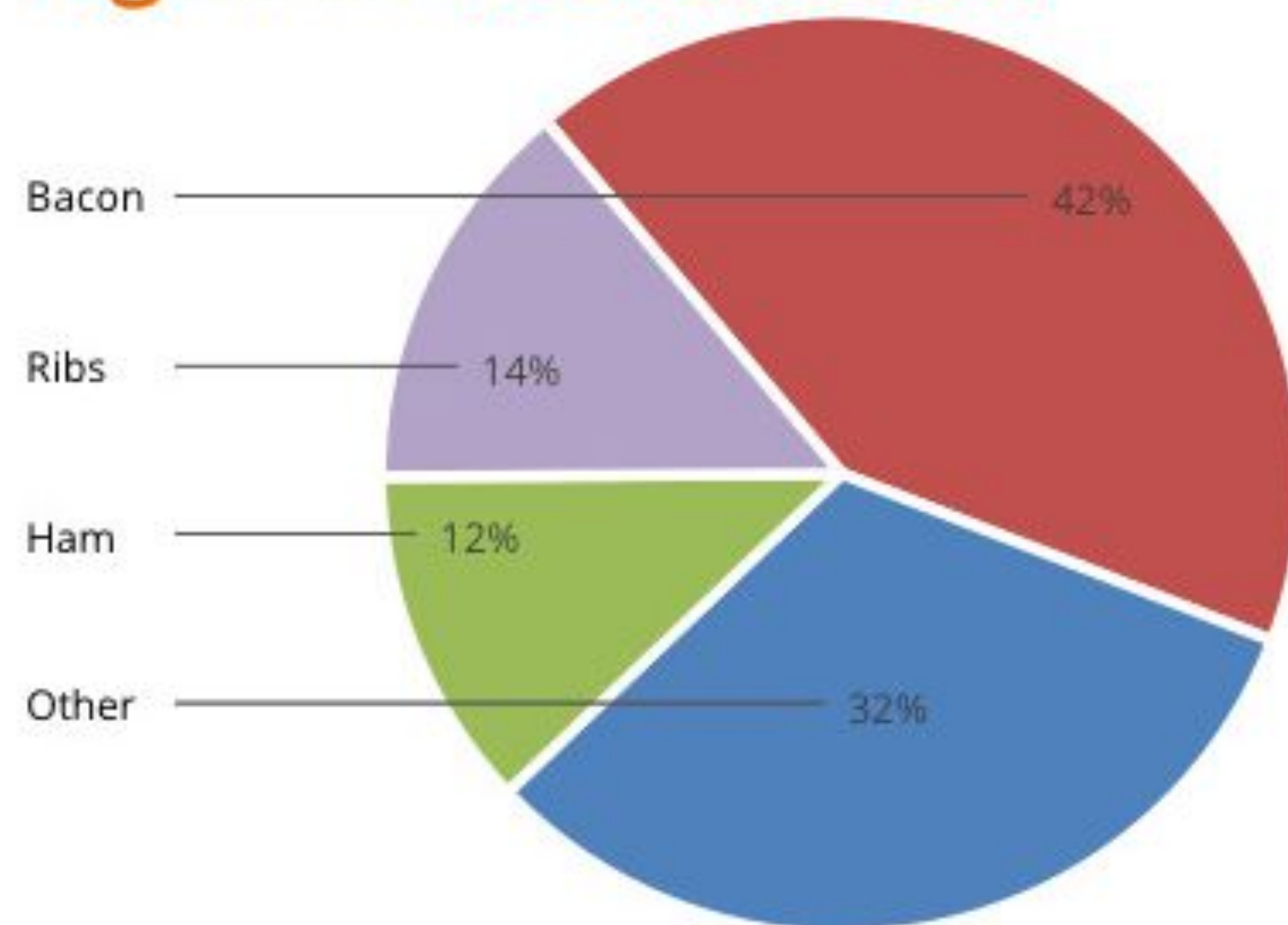
Remove Bolding

Pig Meat Preferences



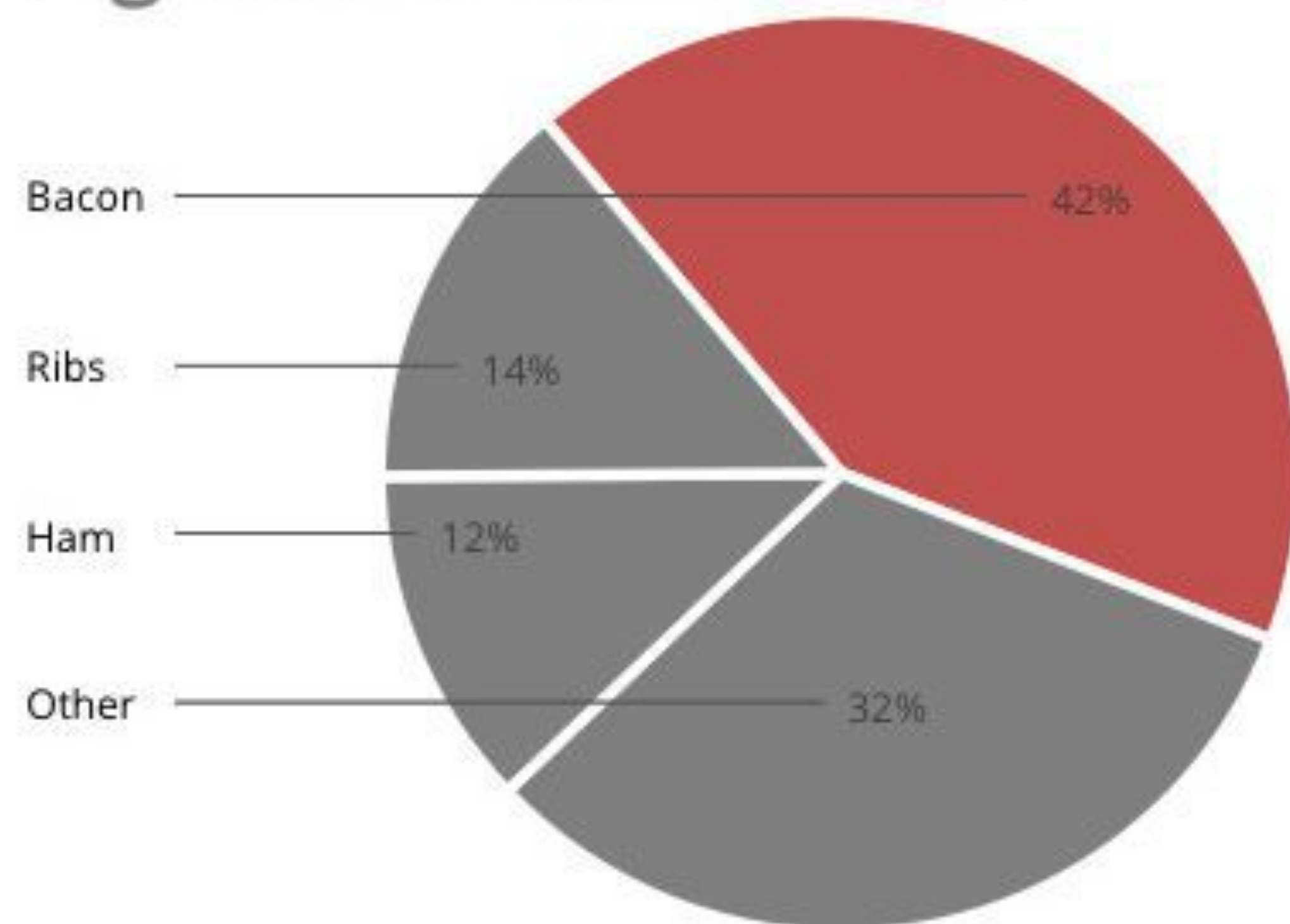
Reduce Colors

Pig Meat Preferences



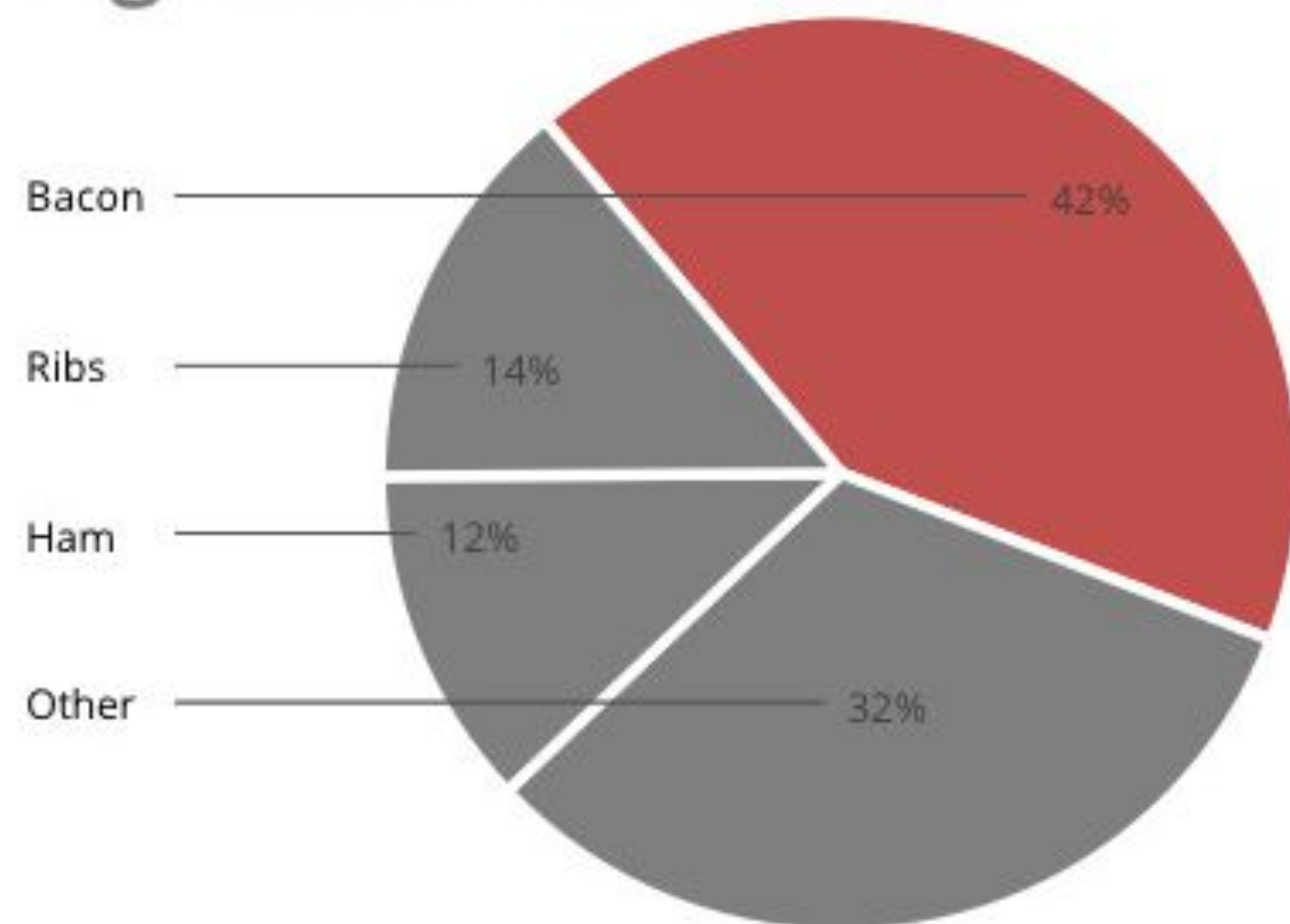
Reduce Colors

Pig Meat Preferences



Remove the wedges

Pig Meat Preferences



Remove the wedges

Pig Meat Preferences



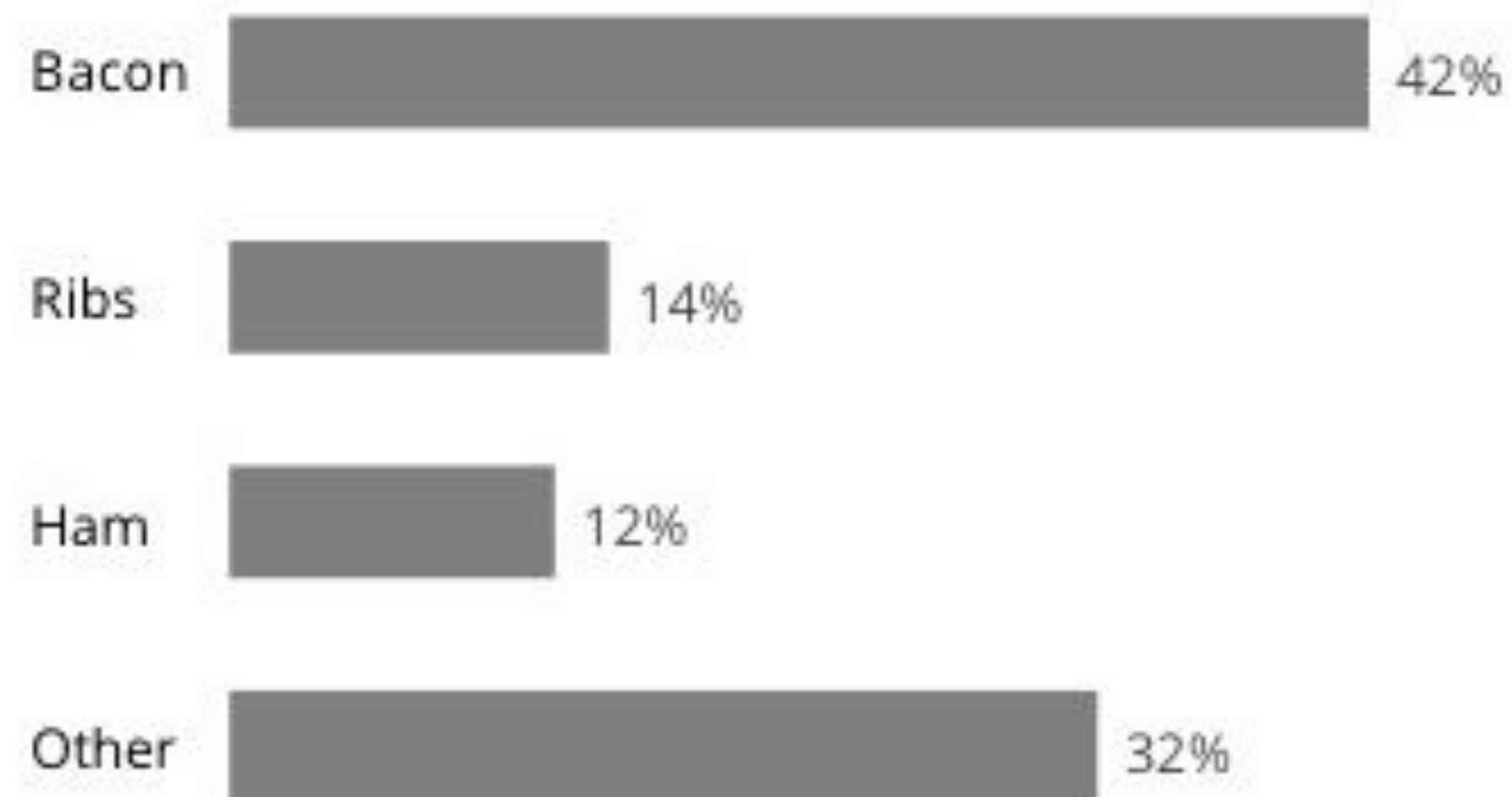
Thicken the lines

Pig Meat Preferences



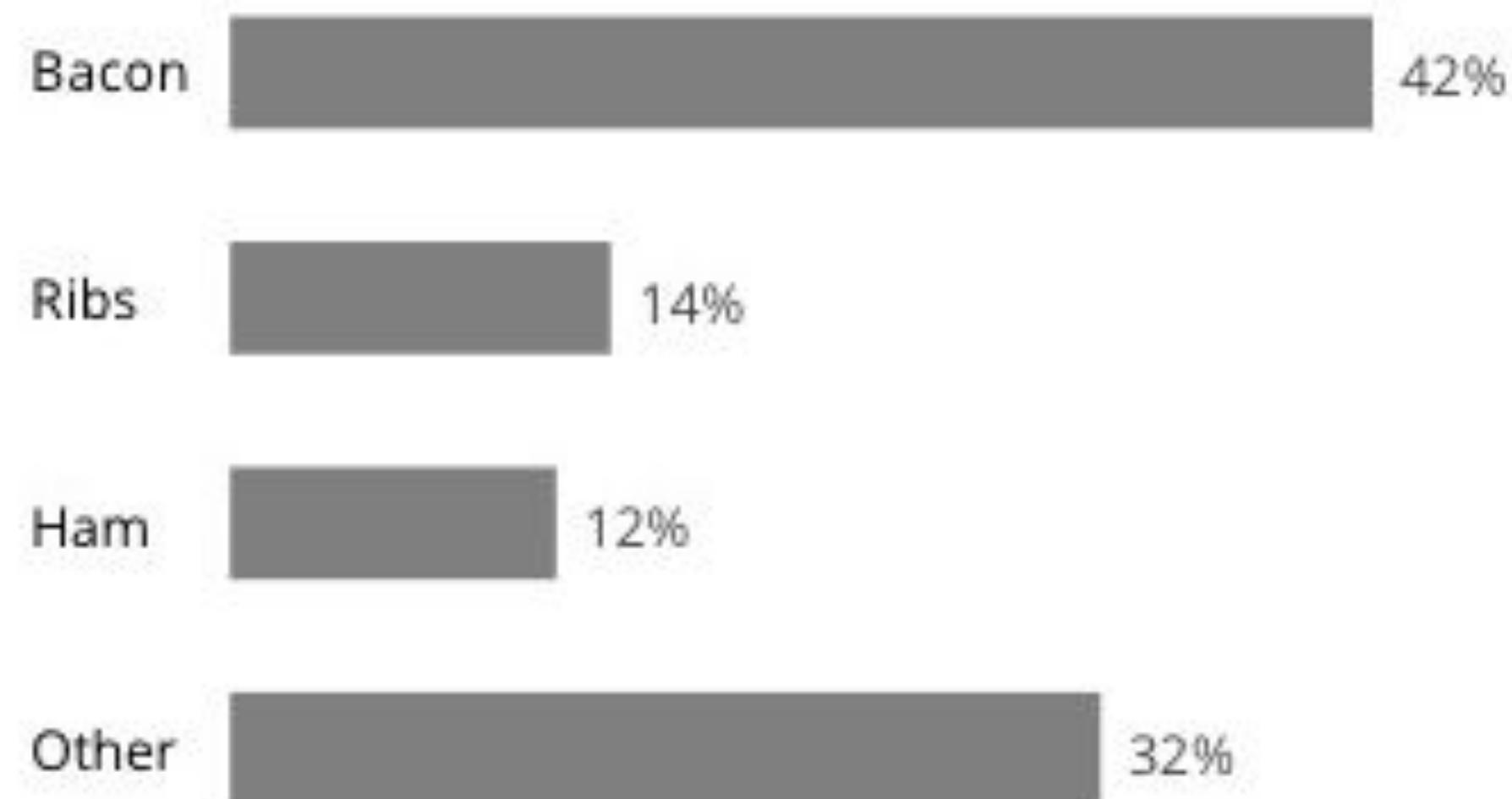
Thicken the lines

Pig Meat Preferences



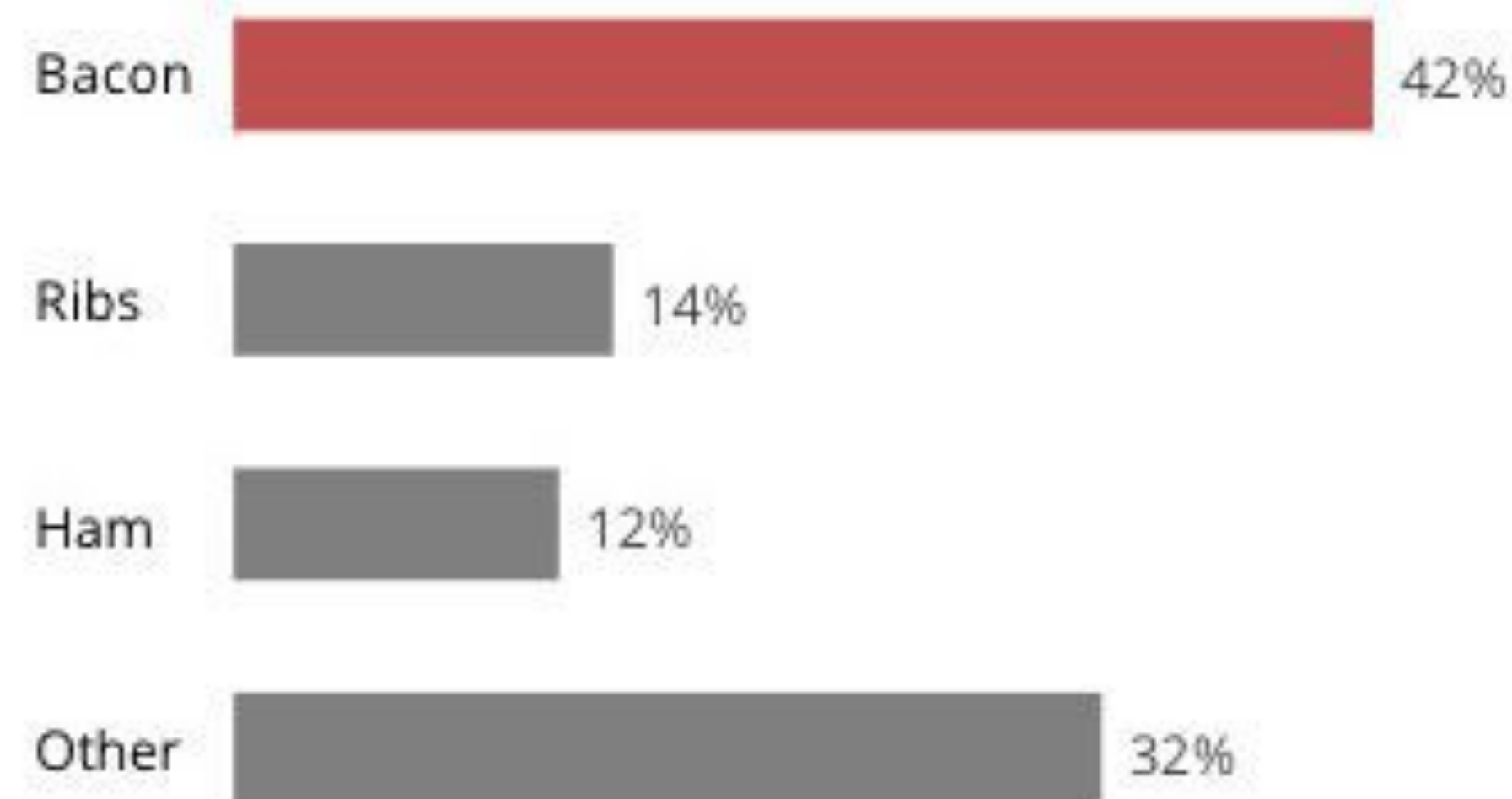
Emphasize the bacon

Pig Meat Preferences

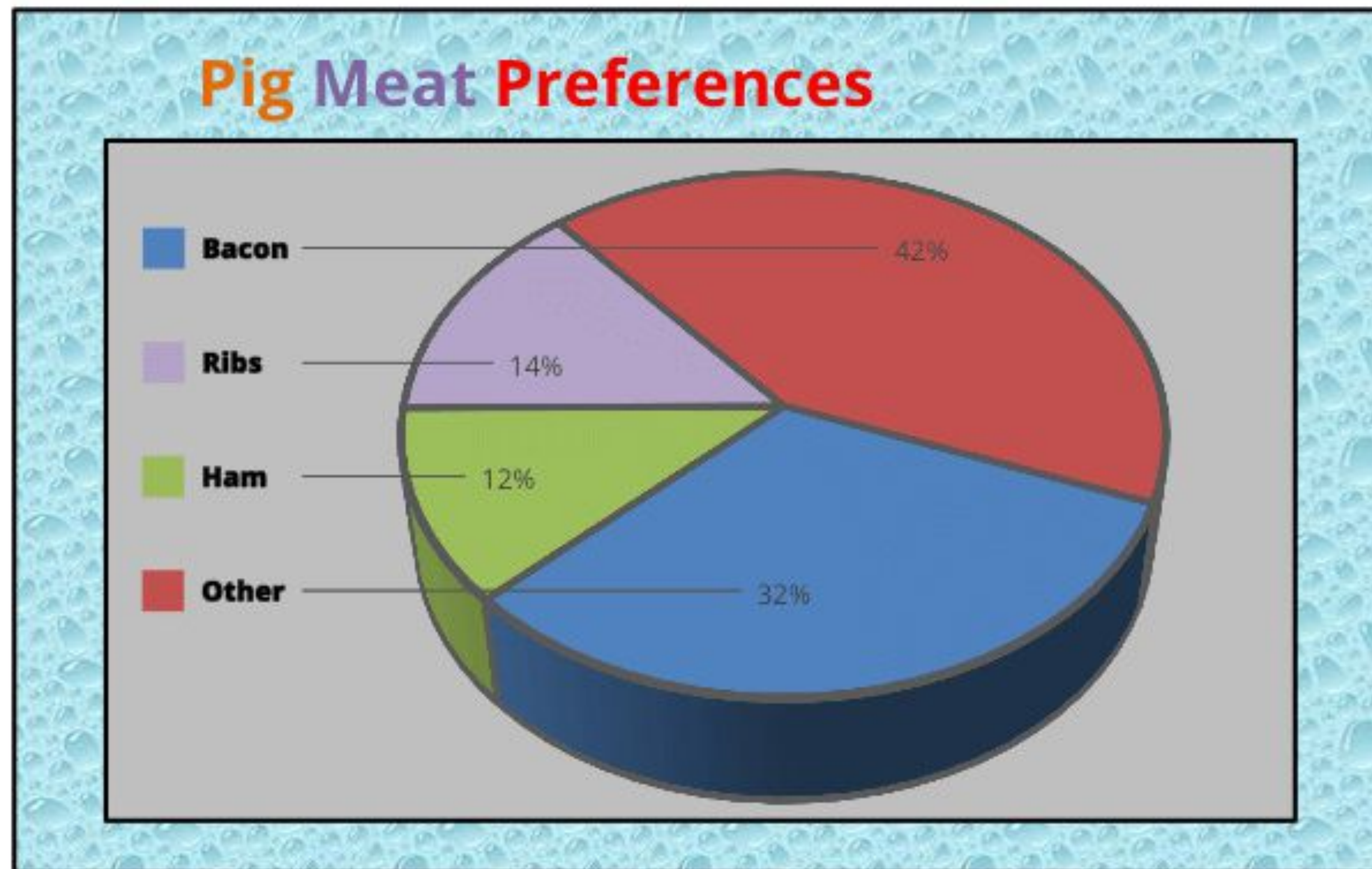


Emphasize the bacon

Pig Meat Preferences

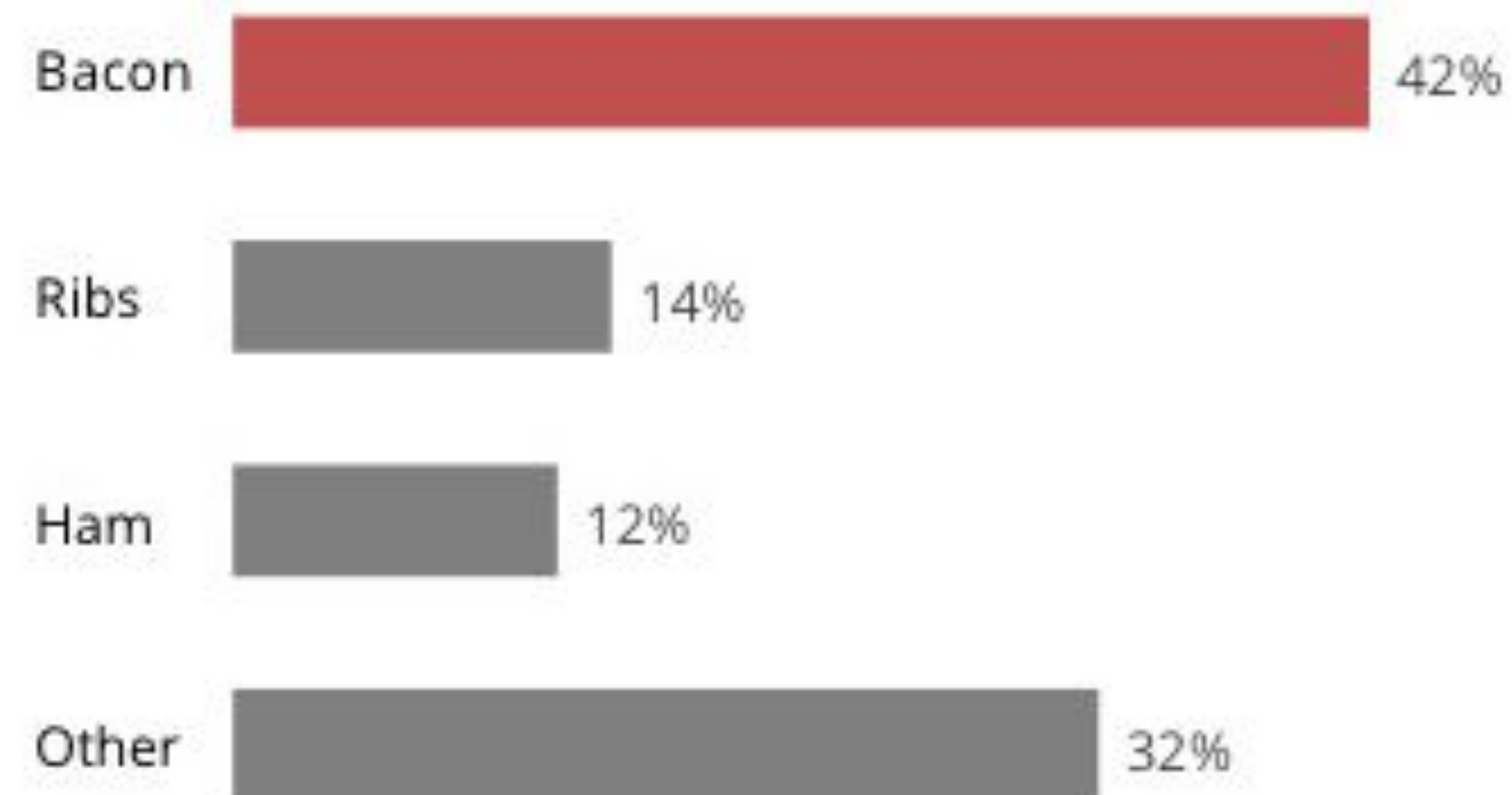


Before

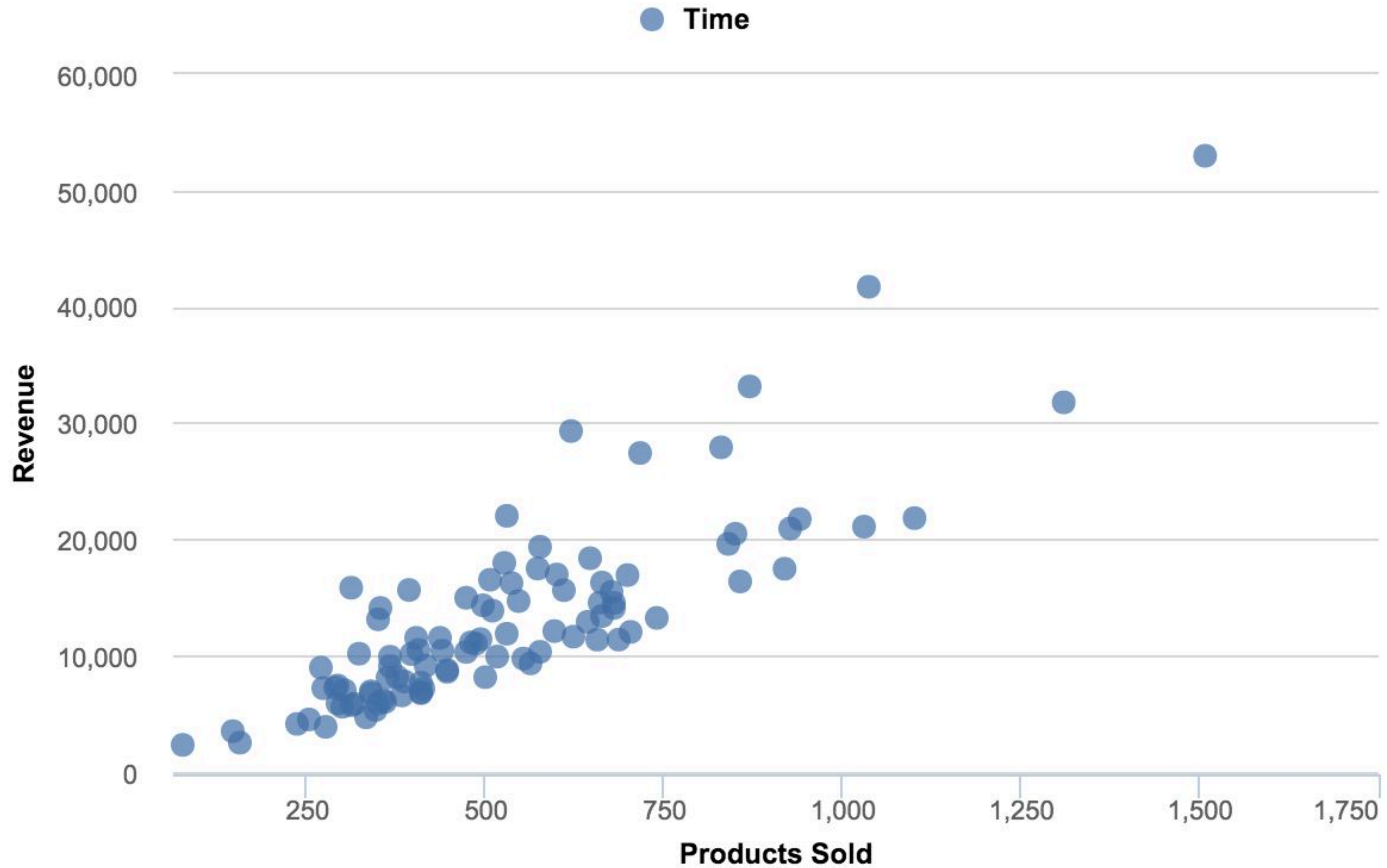


After

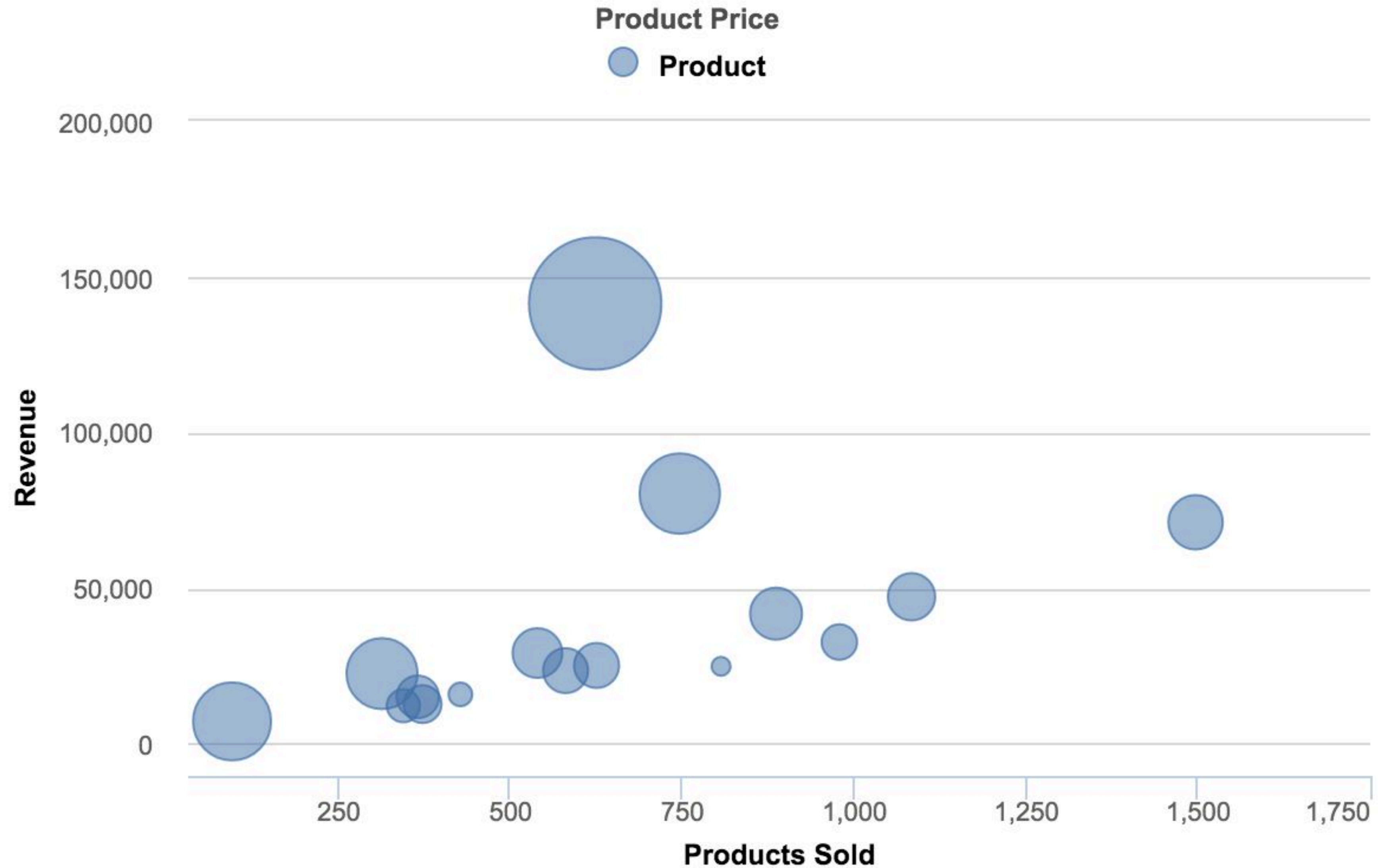
Pig Meat Preferences



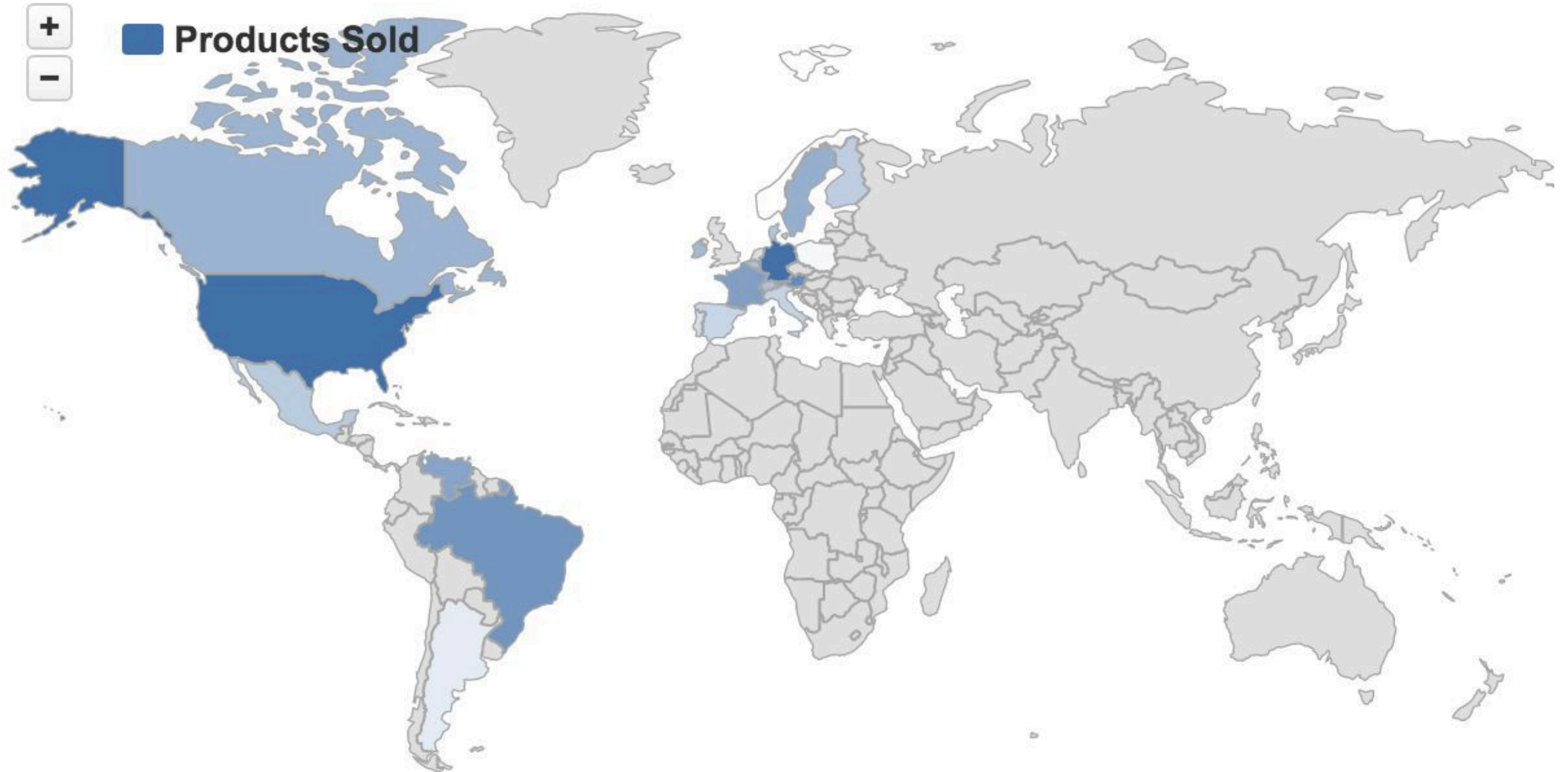
Scatter Charts



Scatter Bubble Charts



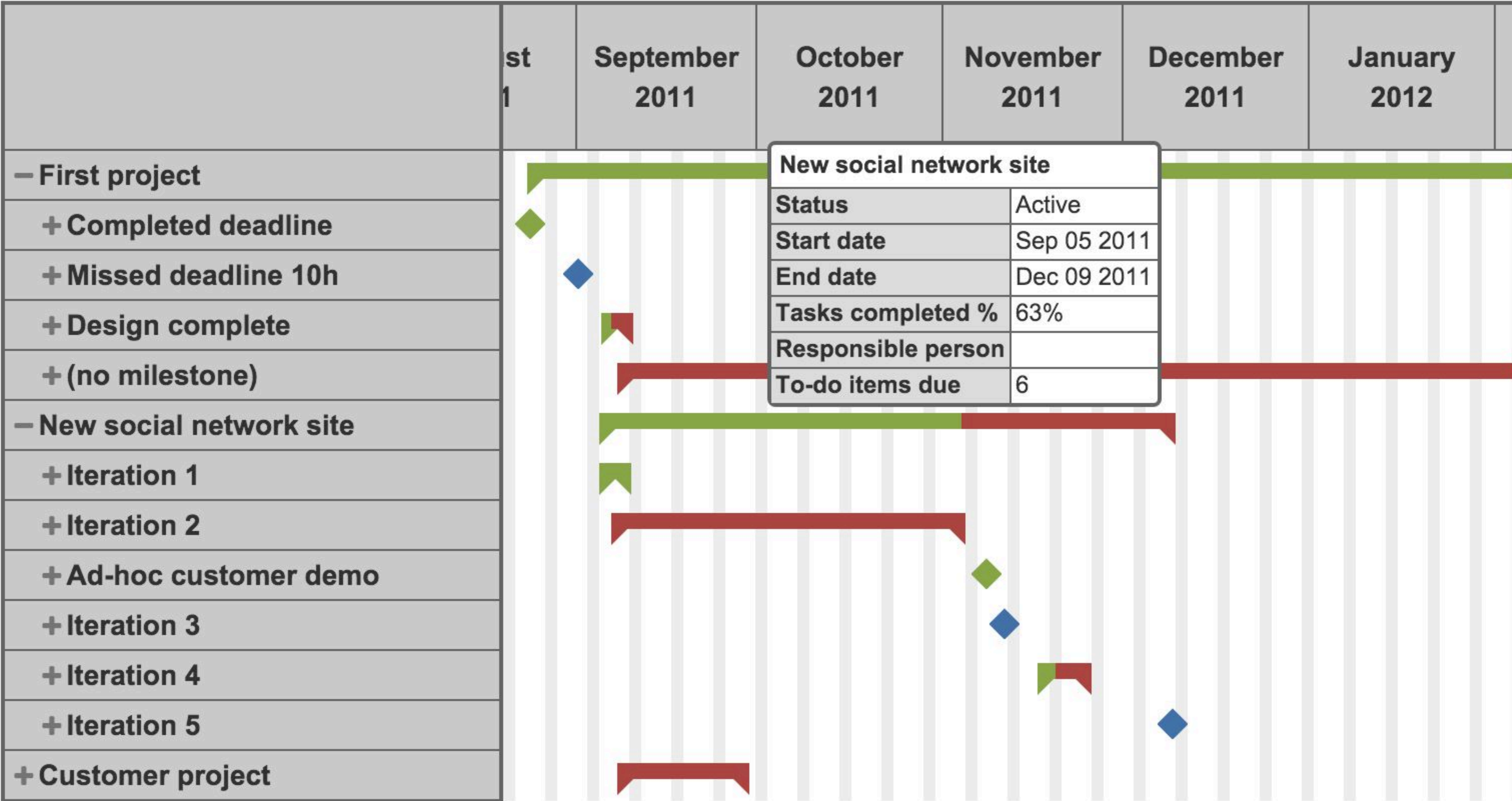
Map Charts



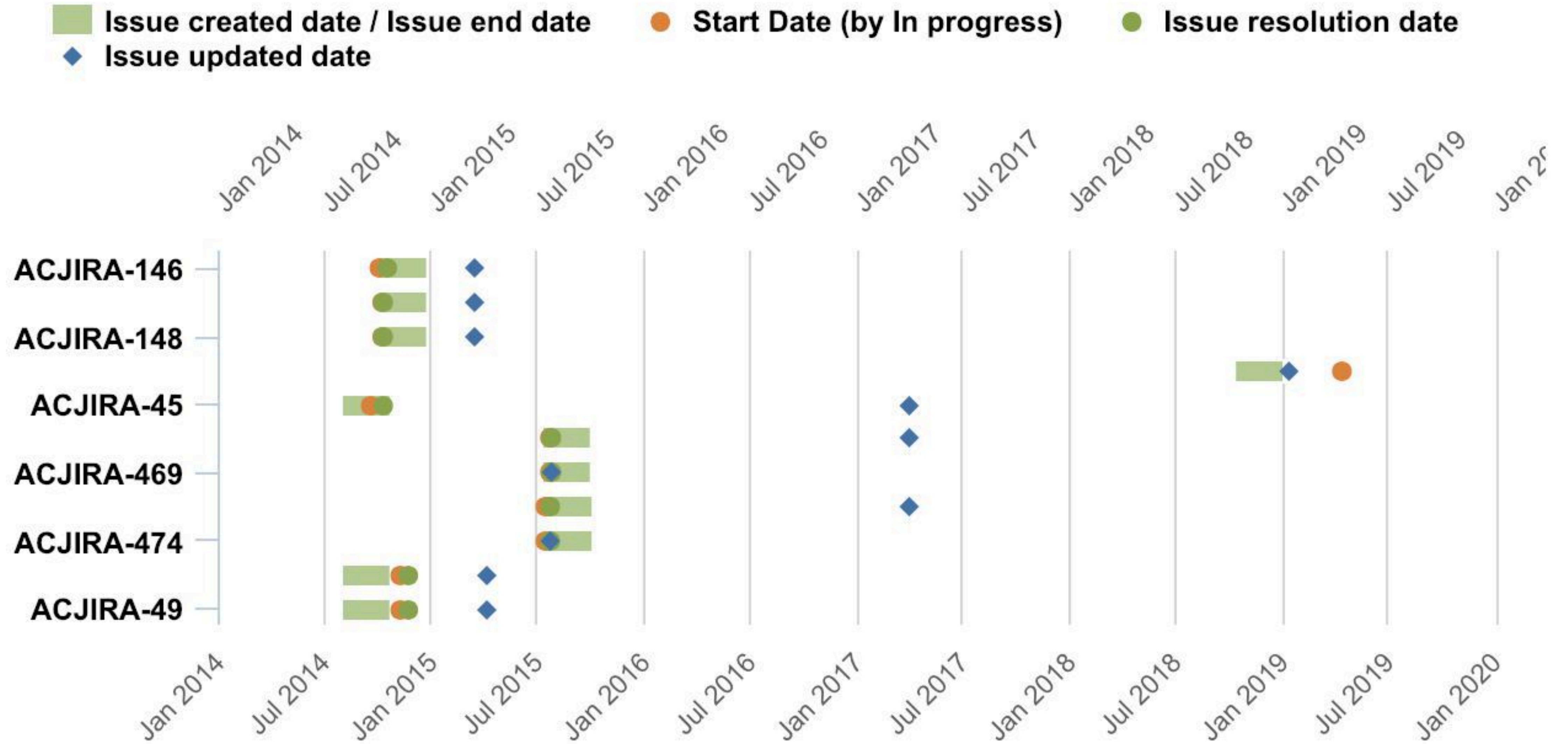
Map Charts



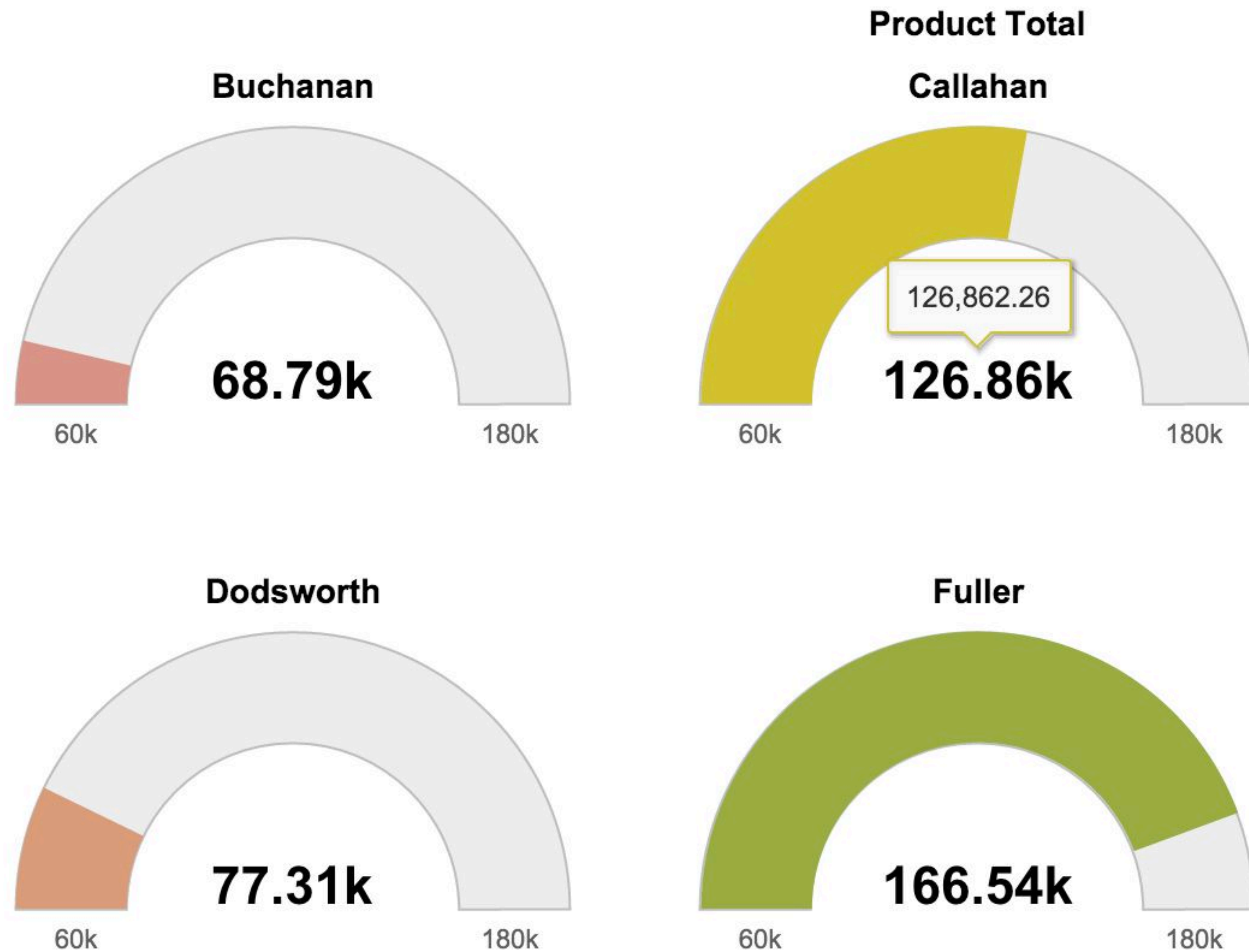
Gantt Charts



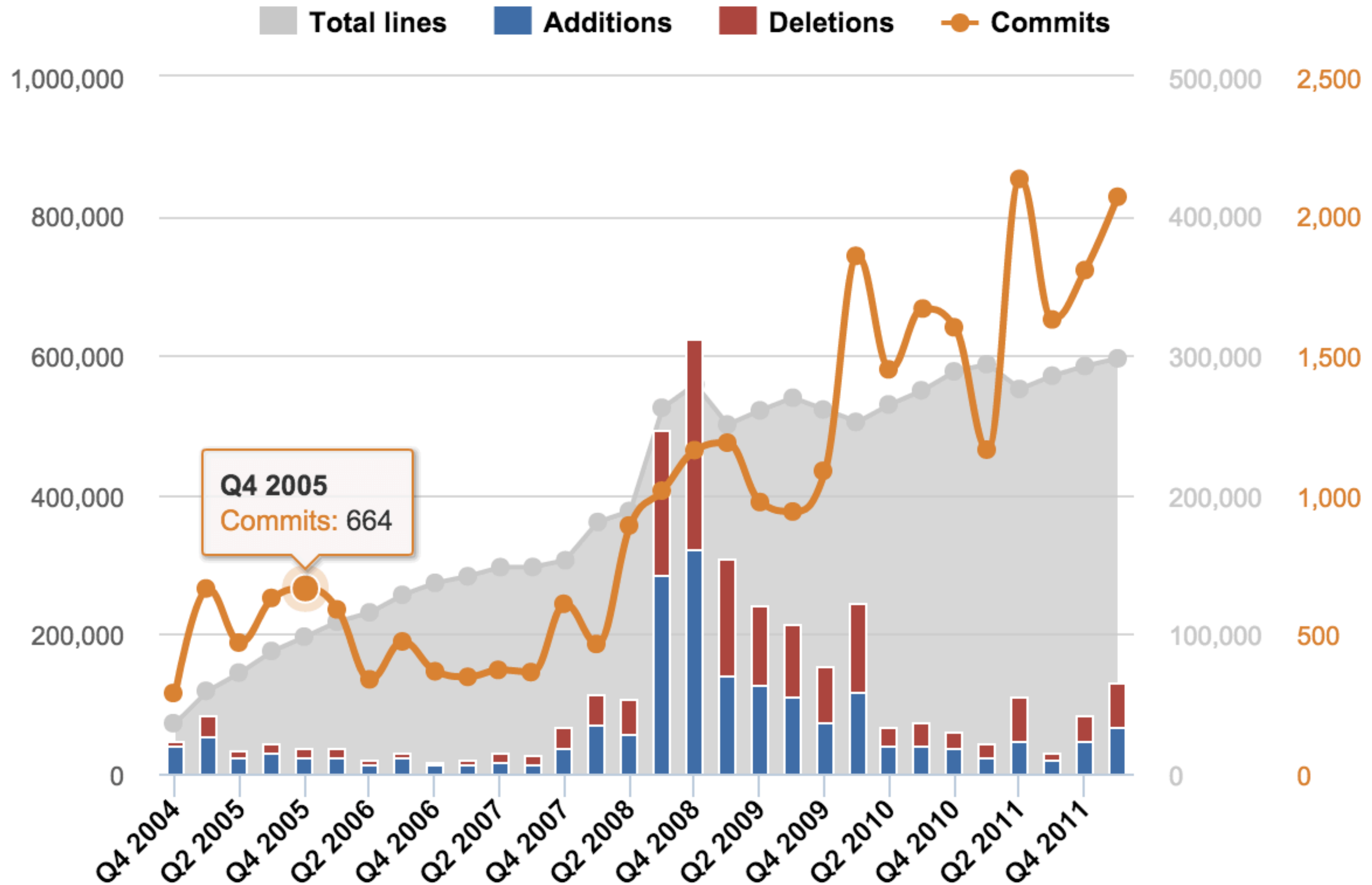
Gantt Charts



Gauge Charts

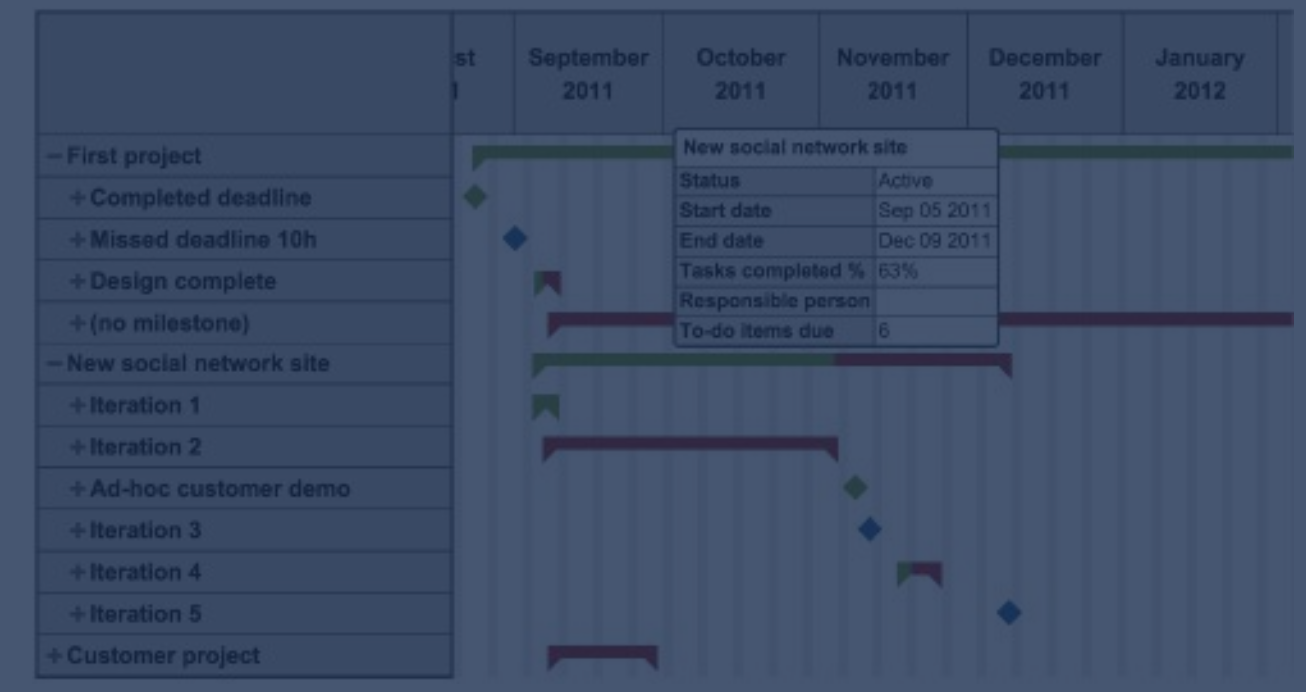
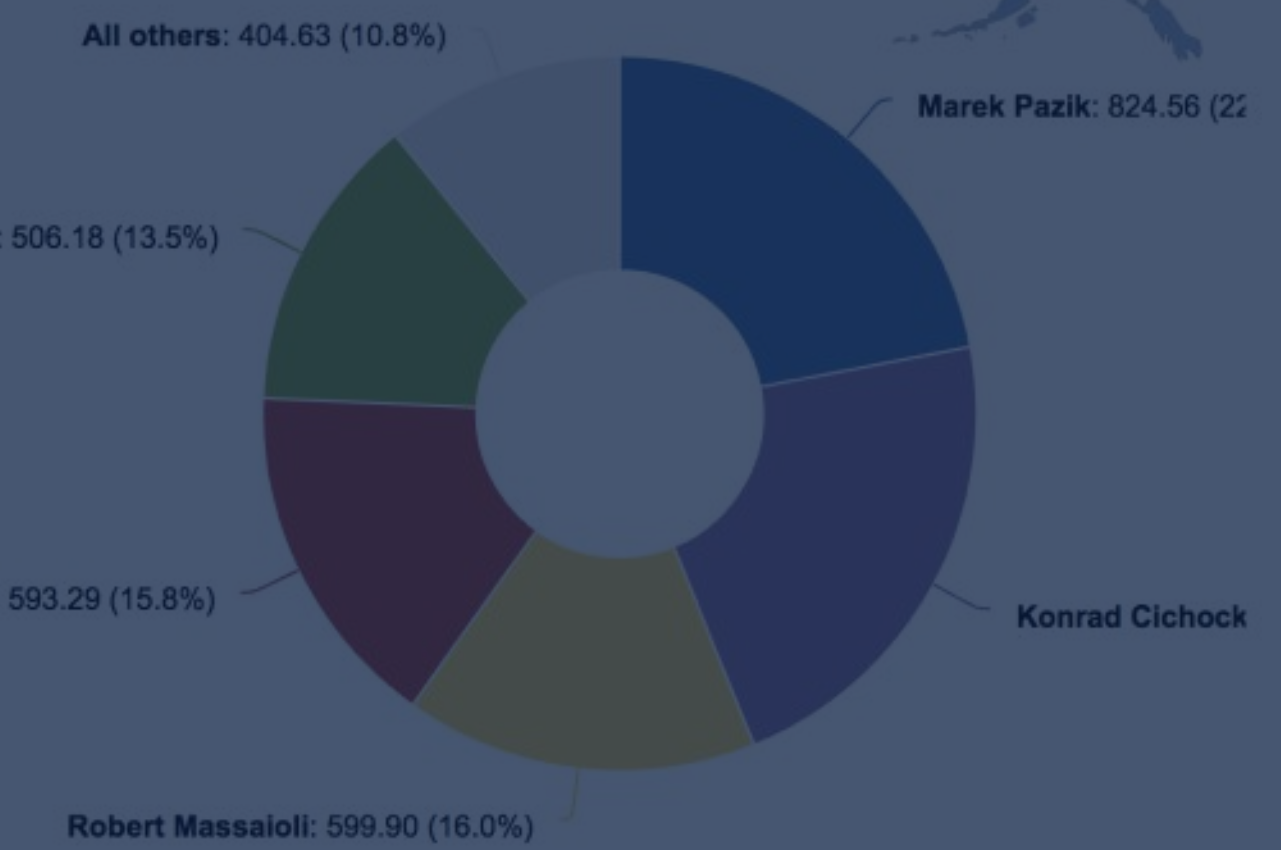
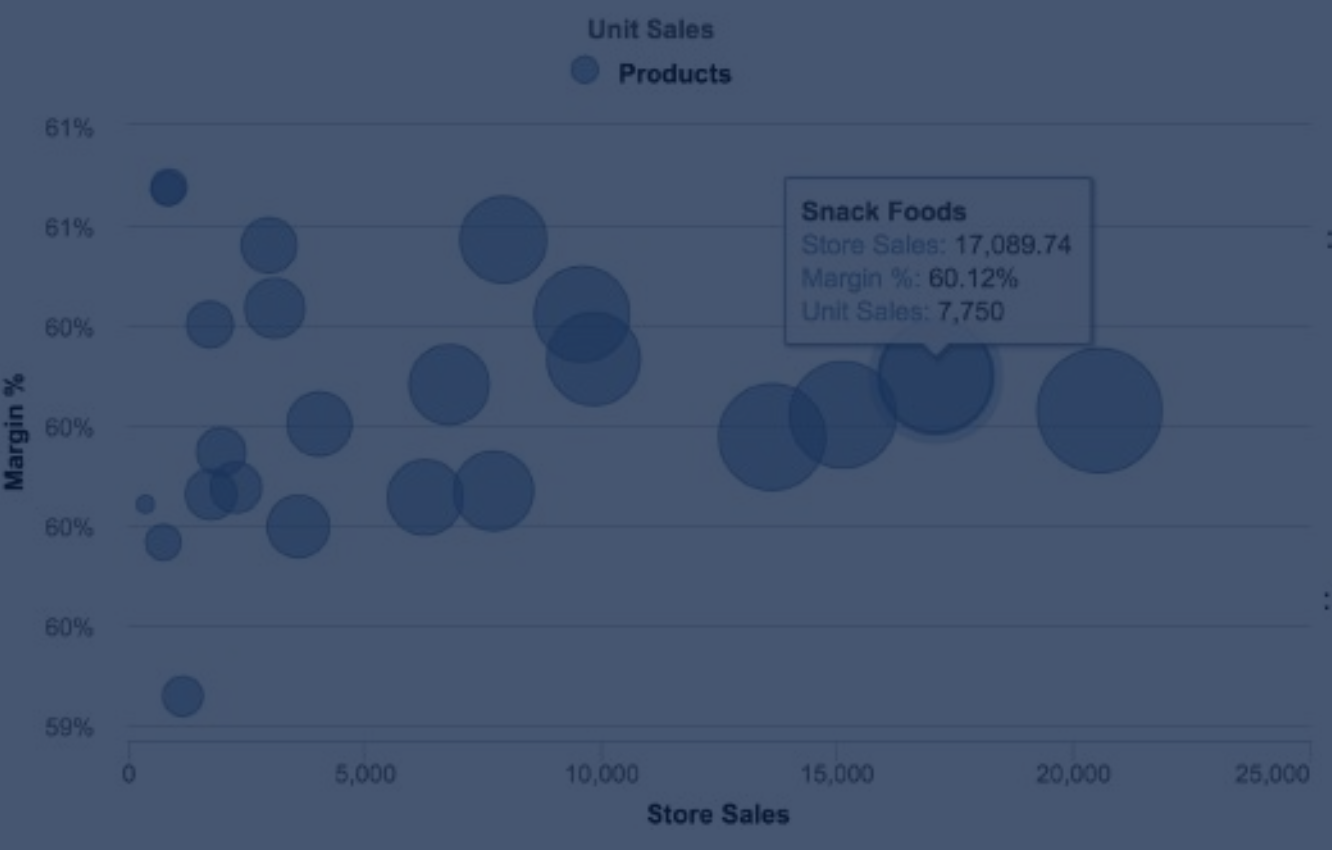
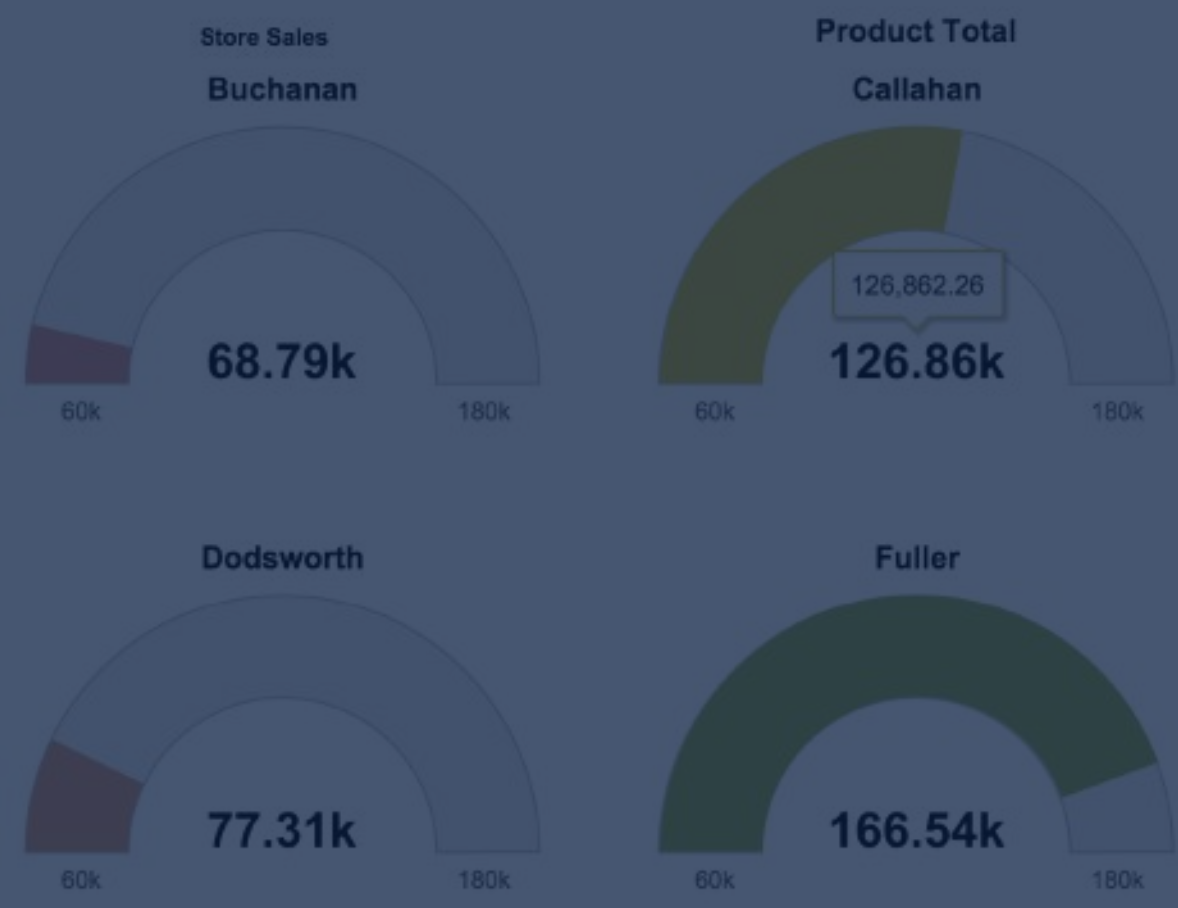


Mixed Charts



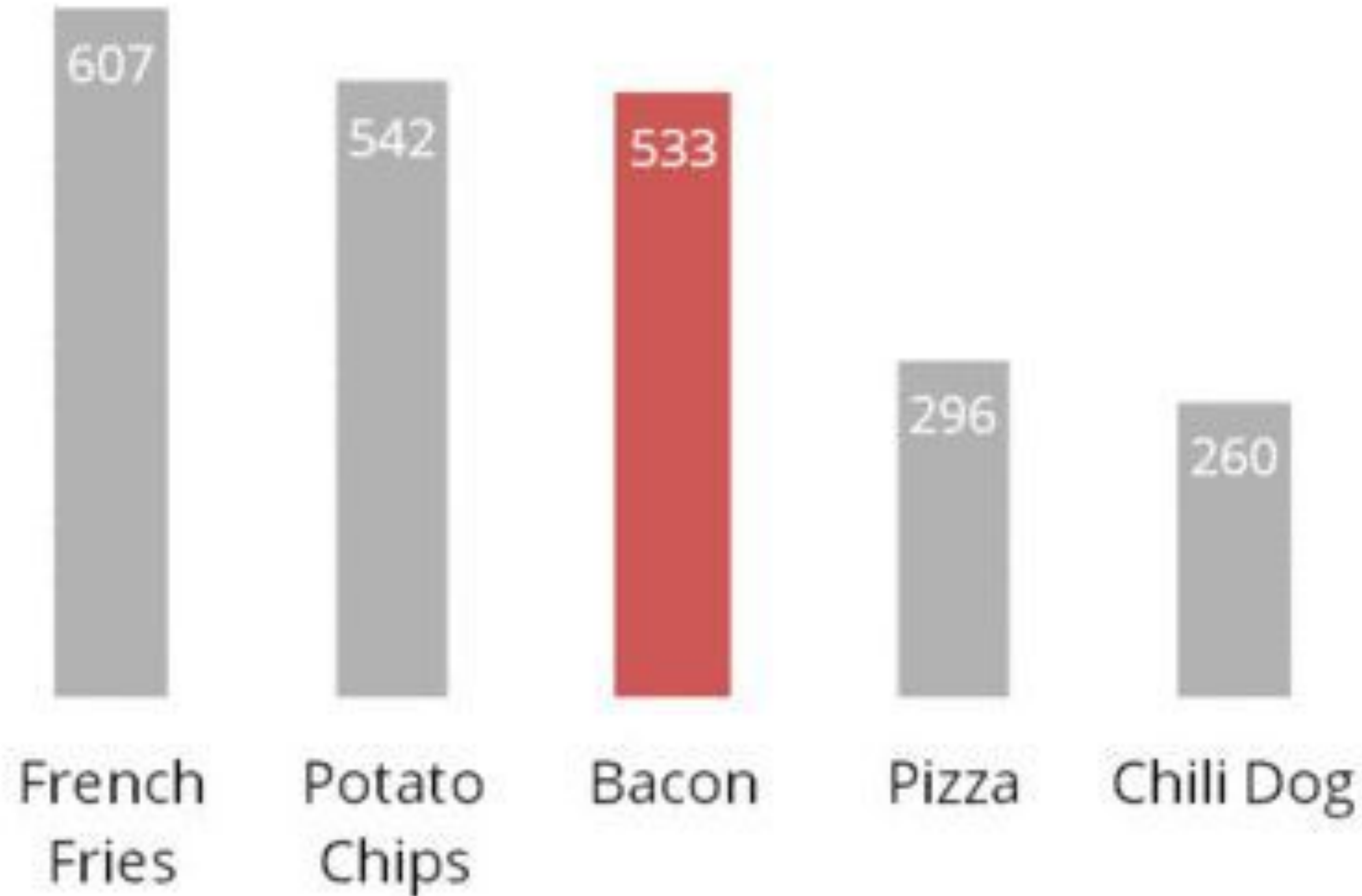
	Store Sales	Store Cost	Unit	Average
- All Customers	139,628.35	55,752.240		
- USA	139,628.35	55,752.240		
+ CA	36,175.20	14,431.085		
- OR	40,170.29	16,081.073		
+ Albany	4,491.26	1,782.817		
+ Beaverton	2,407.97	950.358		
+ Corvallis	5,695.13	2,281.248		
+ Lake Oswego	2,262.56	907.6483	1,102	6.41
+ Lebanon	5,934.62	2,390.0872	2,826	6.49
+ Milwaukie	2,892.32	1,155.6925	1,345	6.92
+ Oregon City	2,324.62	929.6752	1,113	6.55
+ Portland	2,122.12	847.5187	1,001	6.65
+ Salem	4,251.81	1,697.9039	2,104	6.28
+ W. Linn	2,161.61	871.0418	1,041	6.59

- Drill across
 - Gender
 - Products
 - Time
 - Year
 - Quarter
 - Month
 - Day
 - Weekly
 - Year
 - Week
 - Day
 - Fiscal
 - Year
 - Quarter
 - Month
 - Day
- Select this
- Remove
- Order by
- Top rows
- Bottom rows
- Filter rows
- Call formatting

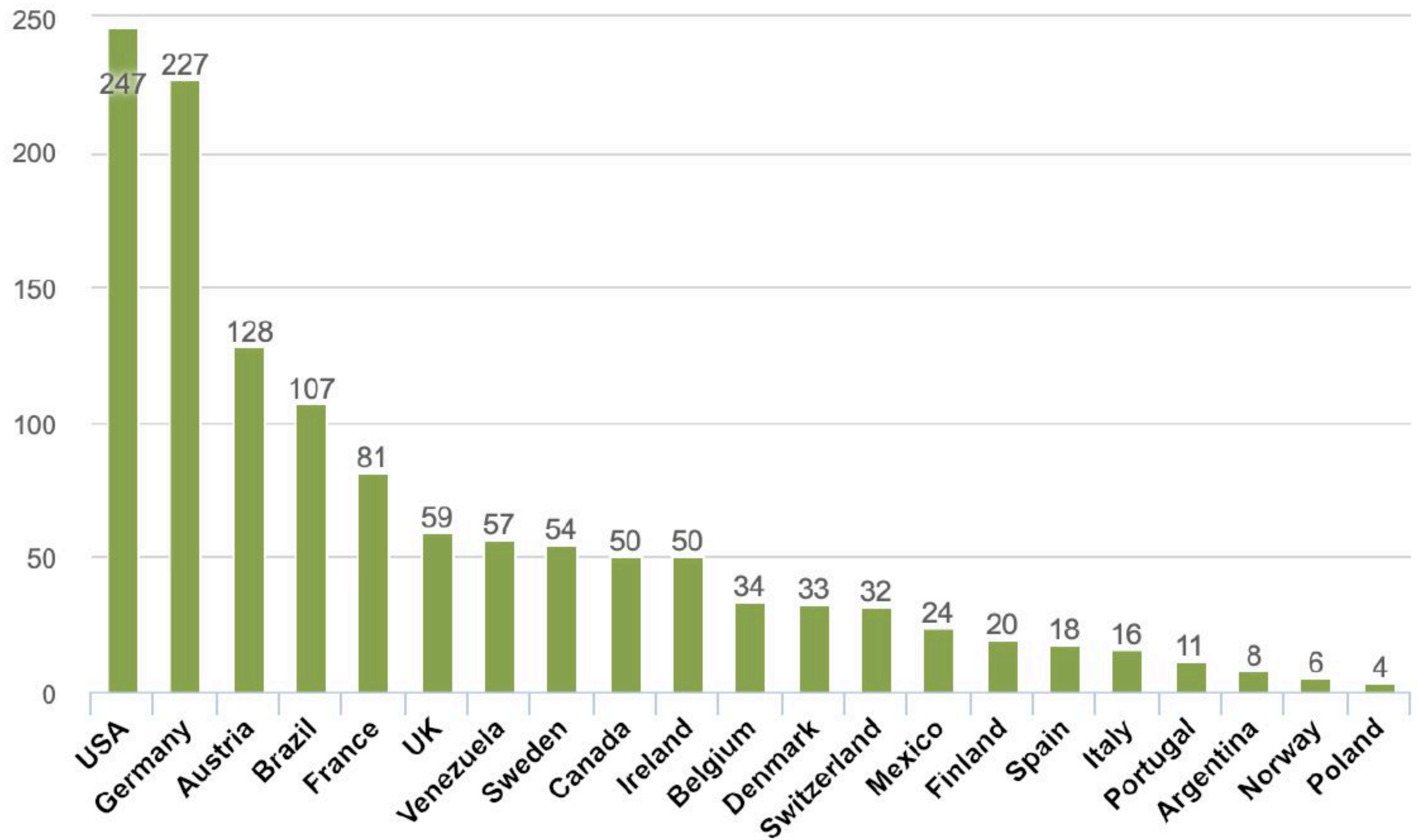


Conclusion

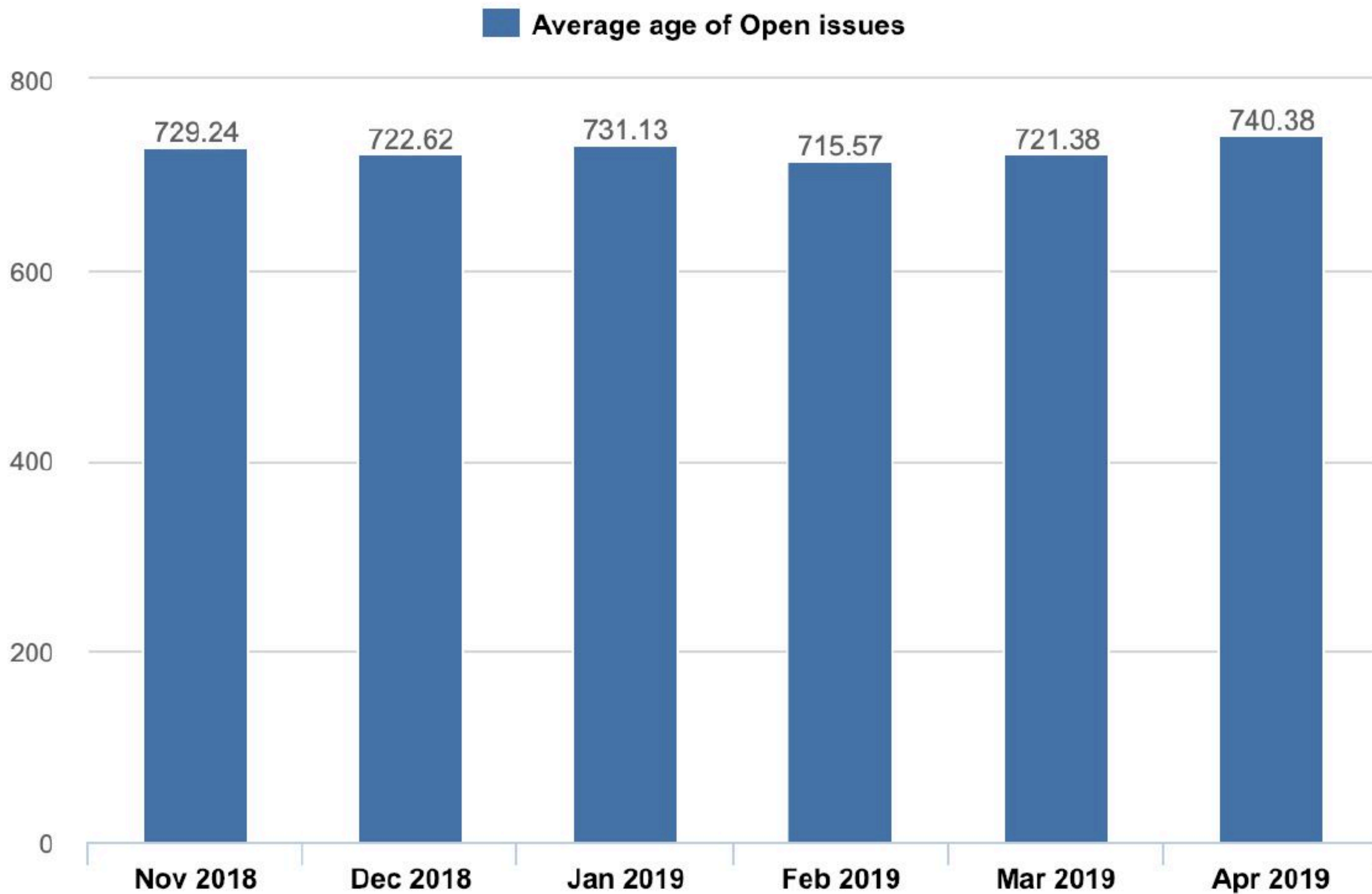
Calories per 100g



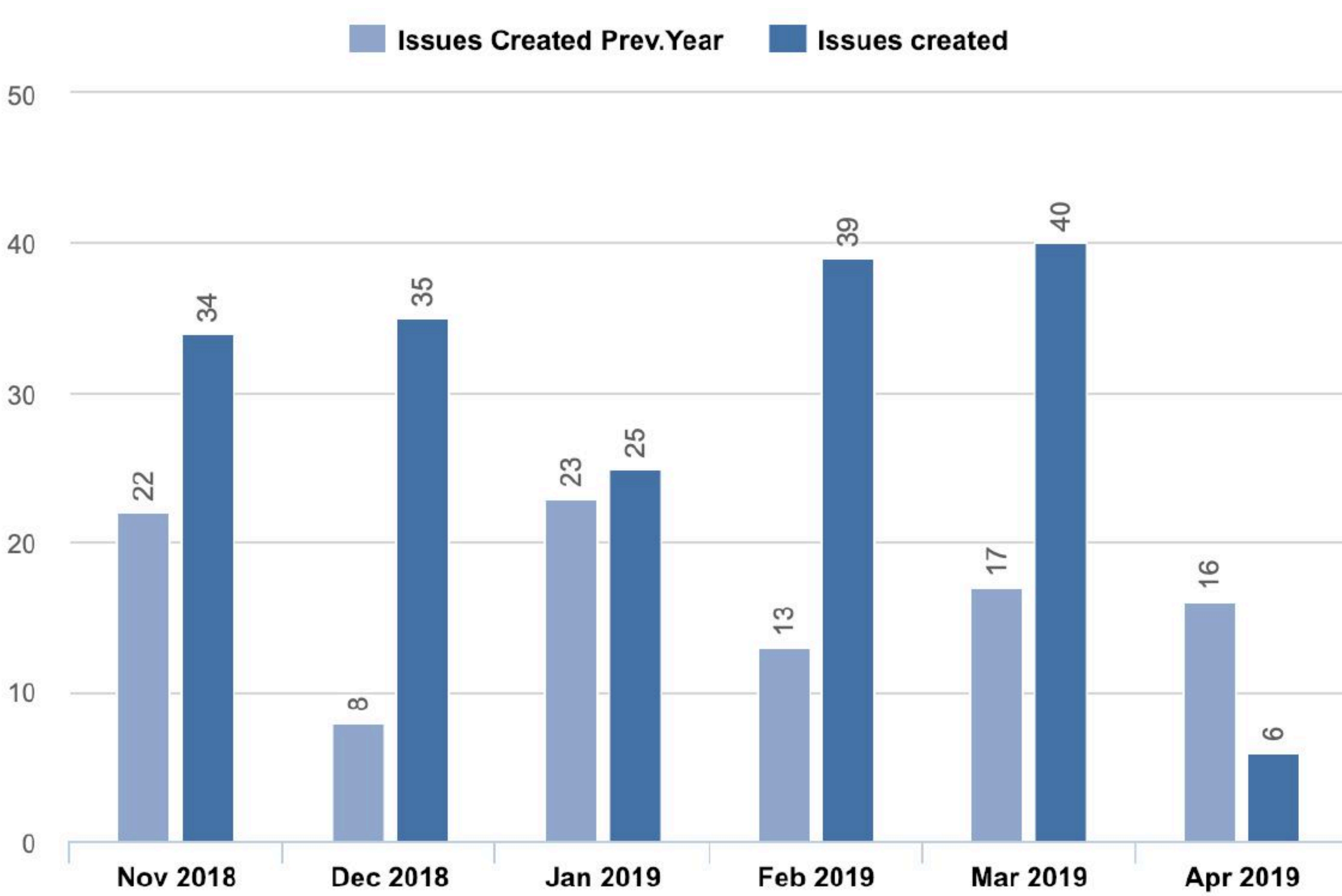
Remove any excess information, lines, colors, and text from a chart that does not add value.



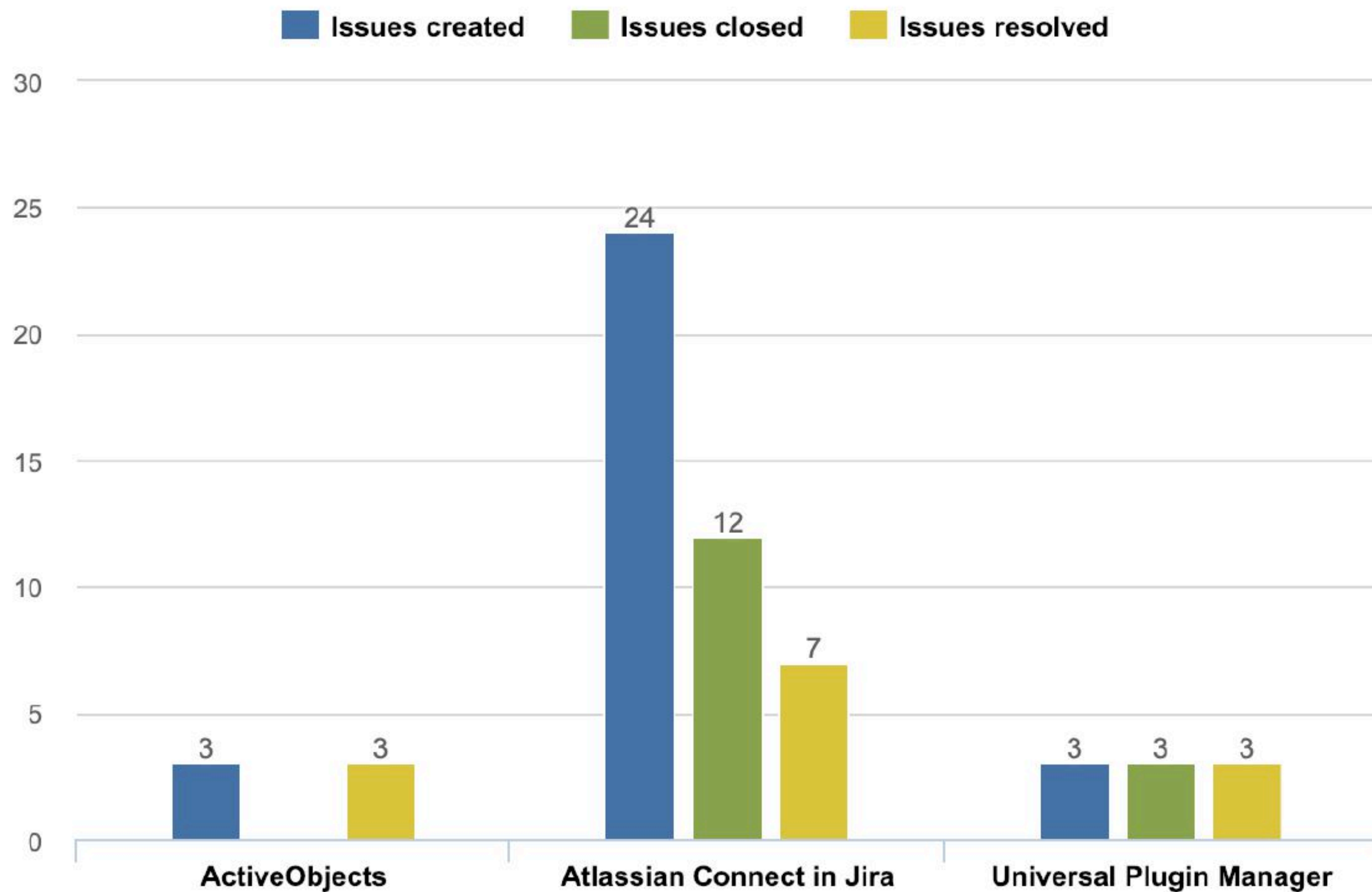
**Sort your data in
ascending or
descending order
by the value
(except for time dimension)**



Use labels directly on the line, column, bar, pie, charts when possible, to avoid indirect look-up.

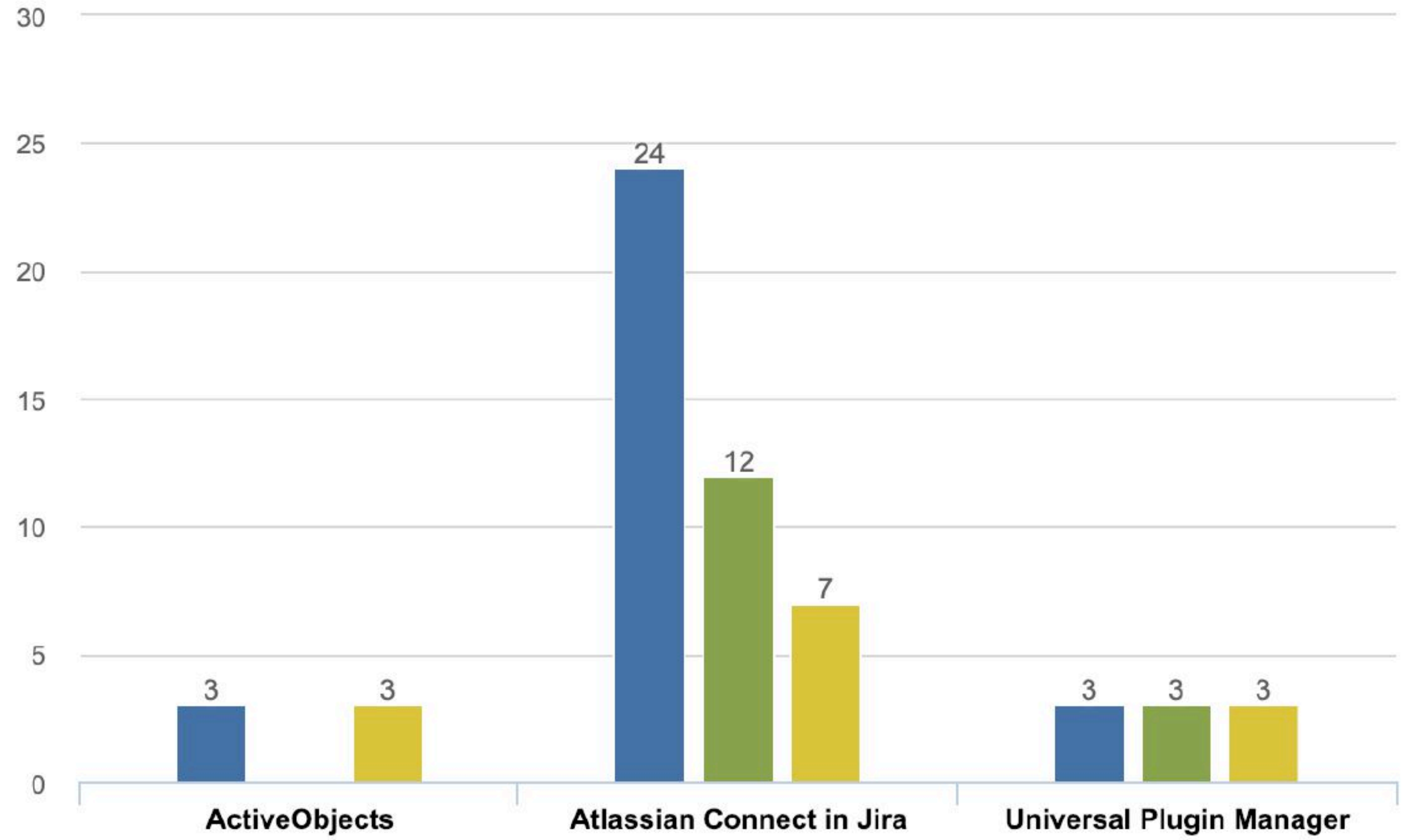


To compare the same measure over different time periods, use same color with different intensity.

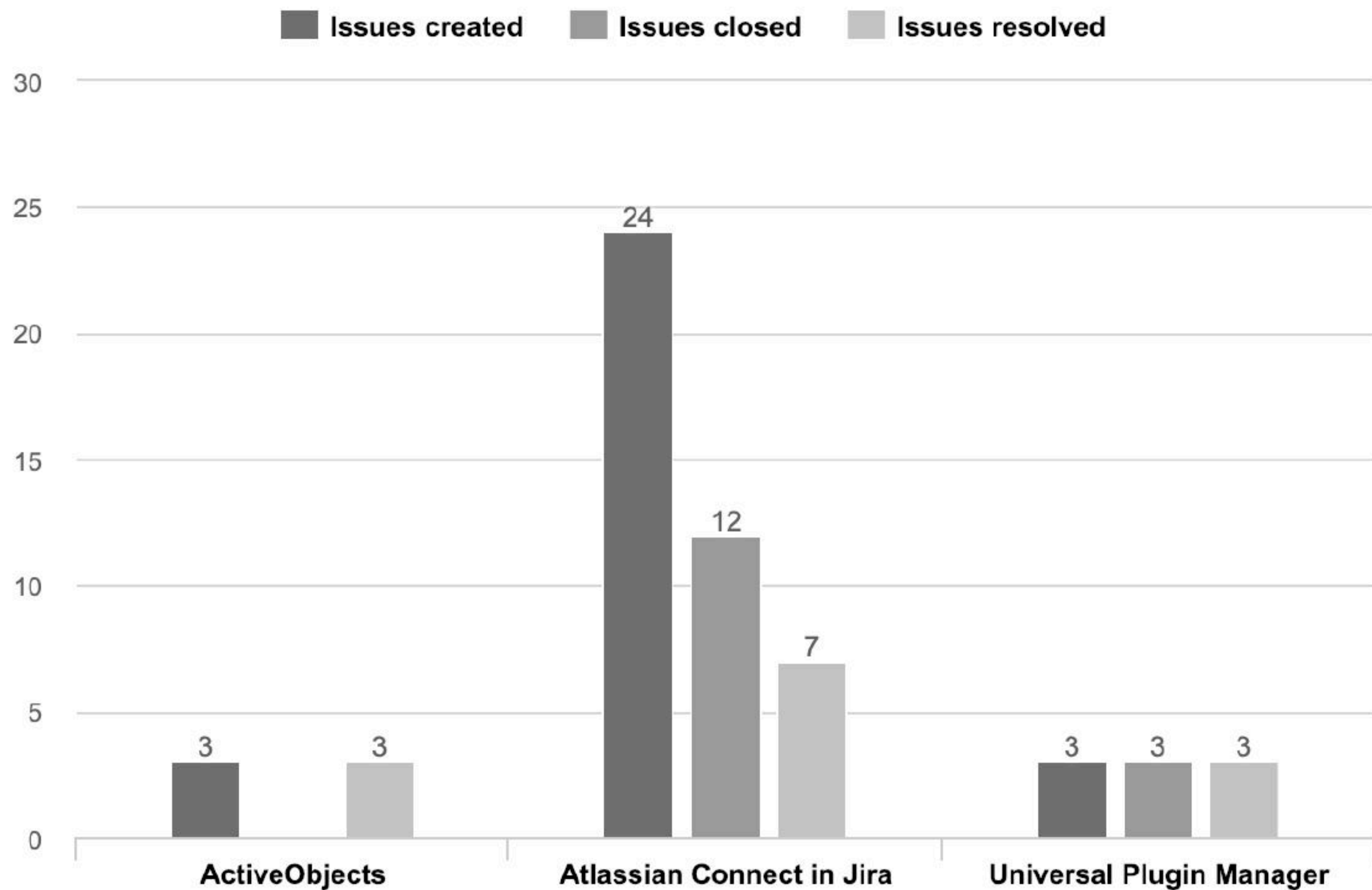


To compare different measures by category, use different colors for each measure.

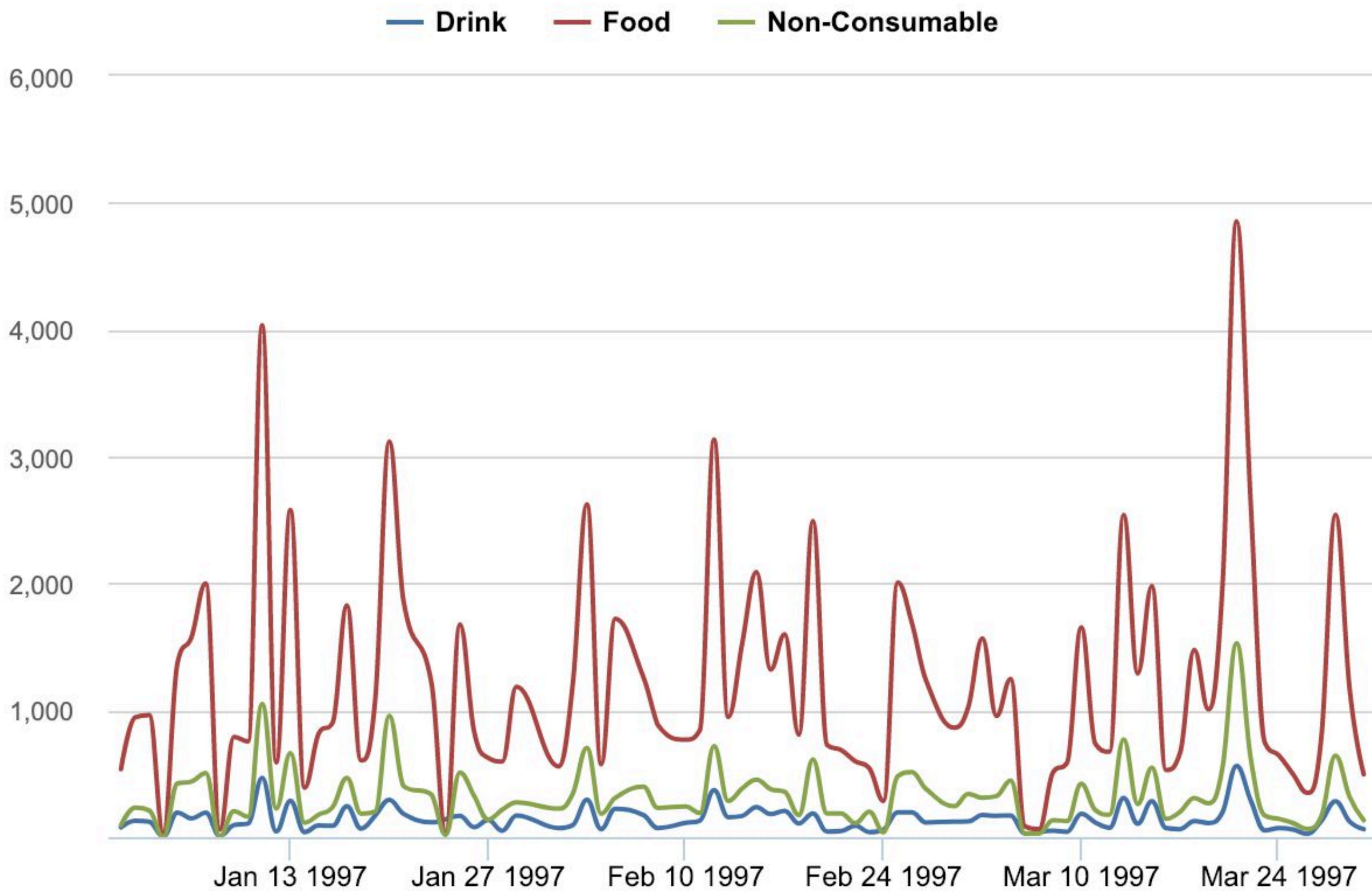
■ Issues created ■ Issues closed ■ Issues resolved



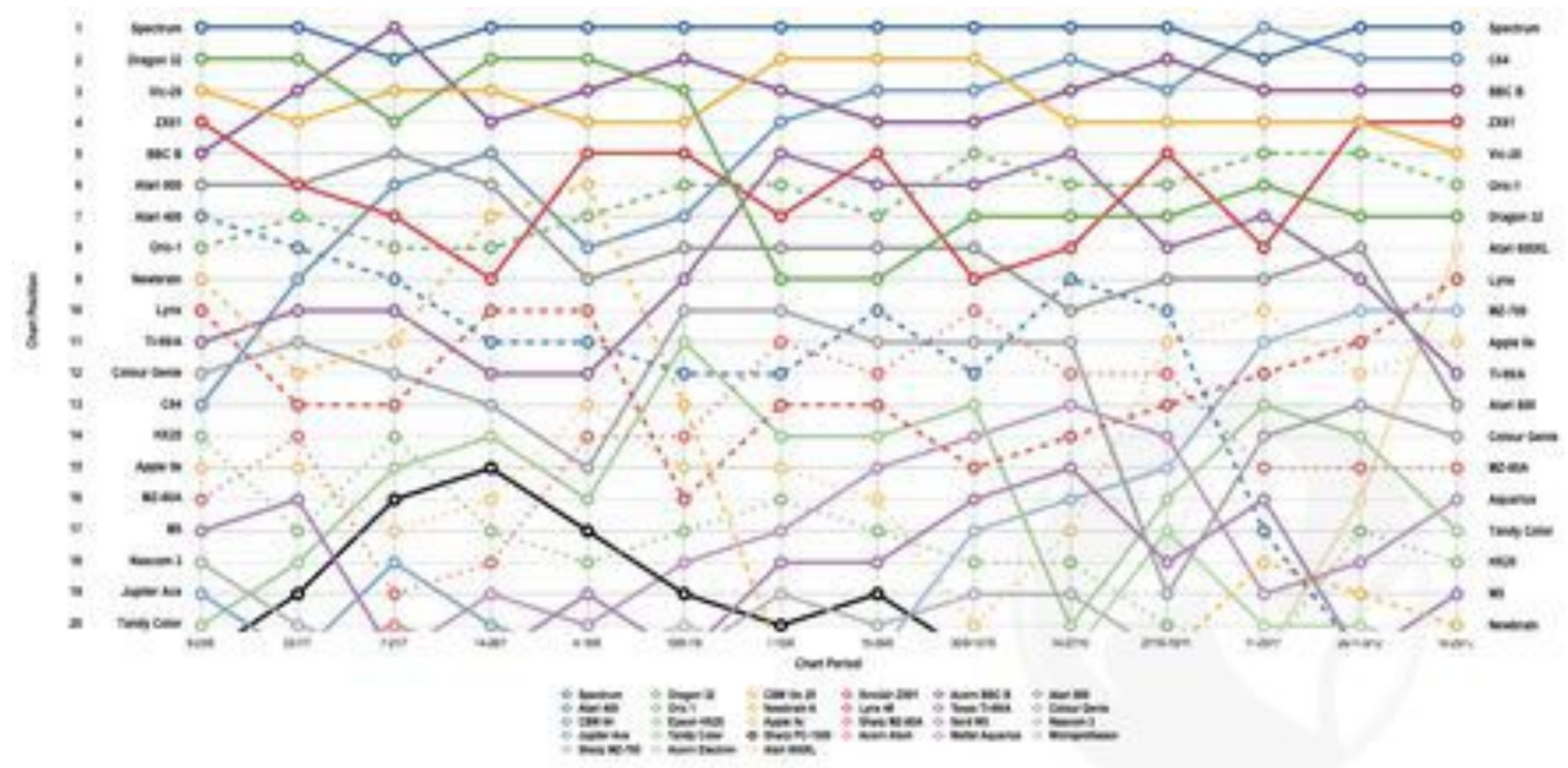
Try to use the same color for each measure across all your reports.



Check how your charts would look in grayscale. If you cannot distinguish color differences, you should change hue and saturation of colors.



**Use Time on
horizontal axis.
Left to right.
Don't skip periods,
even if there are no
values.**



Don't add too much information to a single chart.



Questions?

community.eazybi.com

support@eazybi.com

An aerial view of a city at night, with a color gradient overlay transitioning from red on the left to blue on the right. The city lights are visible through the semi-transparent overlay.

Thank you!